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THE IRON AGE

THE NATIONAL METALWORKING WEEKLY March 16, 1950

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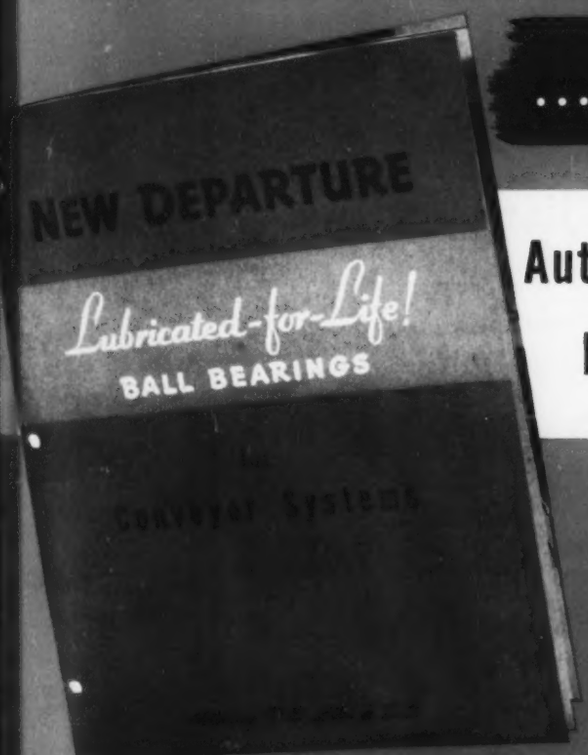

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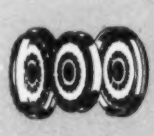

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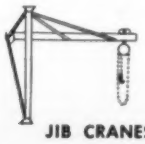

JIB CRANES

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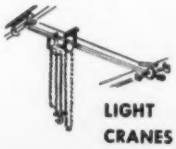

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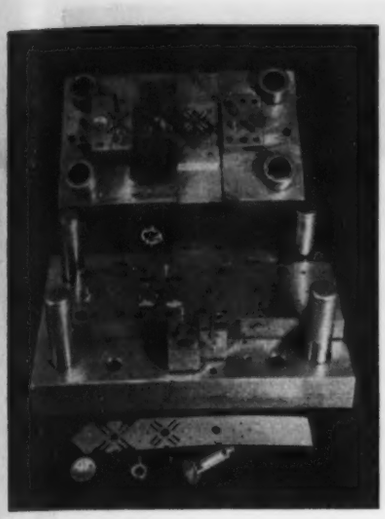
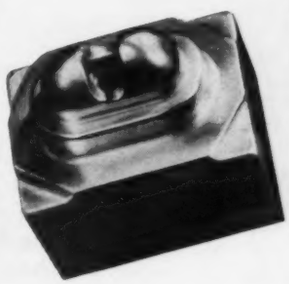


◀ A-H5 and LEHIGH H

Made from A-H5 (5 pct chrome air-hardening) this progressive die made a fine production record on stainless-steel parts. The punches are made of Lehigh H, our popular high-carbon, high-chrome steel for maximum production, minimum distortion.

67 CHISEL ▶

The master hob at the left is used in producing a plastic door catch; the one at the right is used to die-cast a multiple gear. Both are made from 67 Chisel, top-flight steel for tools requiring high shock-resistance and tensile strength.



◀ BTR

These BTR piercing dies put 125 holes in this aluminum kitchen accessory. The punches were in excellent alignment after heat-treatment, show very little wear after long production. BTR is Bethlehem's oil-hardening grade for general-purpose tools.

Bethlehem fine tool steels cover the complete range: carbon and carbon-vanadium, oil- and air-hardening, shock-resisting, hot-work, high-speed, and special-purpose steels. Our technical staff is always ready to help you in tool steel selection and treatment.

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THE IRON AGE

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MARCH 16, 1950 • • • VOL. 165, NO. 11

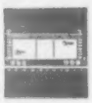
Special Article

The success of the Chevrolet automatic transmission opens up a new field in the design of power converters. The effective precision stamping and brazing of elements fabricated from high tolerance sheet steel points the way to more extensive use of parts drawn or stamped to precise shapes and dimensions.—p. 71.

Issue Highlights

The year 1949 was one of technical and productive progress in the field of metal finishing. In spite of this, it did not fare well economically because (1) retail prices were lower, (2) material costs did not come down appreciably, and (3) the largest factor, labor, continued to rise.—p. 76.

Available space within the airframe is the greatest single factor influencing the design of aircraft tanks. Other considerations are volume requirements, vibration intensities, shape, material strengths, welding sequences, and location within the airframe.—p. 86.



Lack of orders isn't the only worry of the independent railroad car builders. Of equal concern is the proportion of available business the railroads are taking into their own shops. The car builders don't like to think this is a trend, but recent orders give them little comfort.—p. 99.

A Ford executive has built himself a satisfactory steel house for $4000. But what pleases him most is that it was built with the assistance of his wife, an architect friend, a Neon sign maker and a specialist in mastic compounds. —p. 103.

Steelmen hail the proposed rate reductions on 80,000 lb carload shipments as a step in the right direction. But they want a lower minimum established and they would like to see more steel products added to the list.—p. 107.

Coming Next Week

Profit sharing has been tossed about by management and kicked around by labor. Outdated studies say it is unstable, but the facts are that many companies and their employees are very well satisfied with their profit-sharing plans, many of which have been in existence for years. It is one way of reinforcing the capitalistic system.

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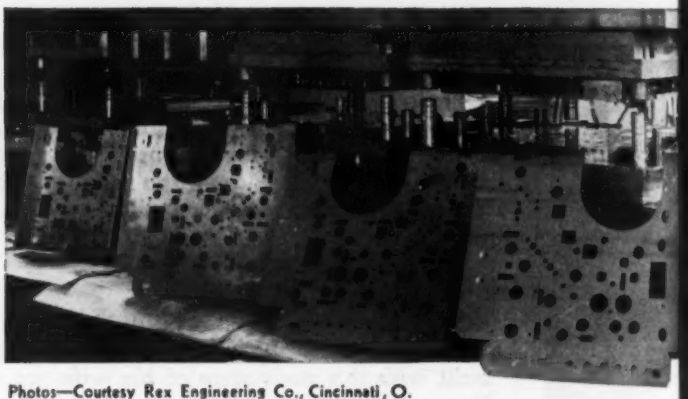
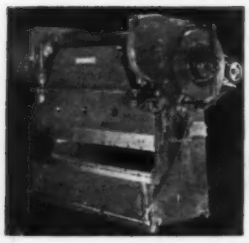


Photos—Courtesy Rex Engineering Co., Cincinnati, O.

Write for technical Bulletin 175, a compact treatise on Press Brake practice, dies and applications.



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SHAPERS · SHEARS · BRAKES

Editorial

INDUSTRY VIEWPOINTS

Don't Pull Both Ways

THE metalworking industry is geared to do the greatest production job in its history. Men in the mills and the shops have the tools and the capacity. There will be more improvements. There will be more expansion.

But there is one $64 question. Are we going to sell what we have the ability to make? You can have all the men and machines you want but if you don't sell it, you are lost.

Companies are doing a good job in sales training. New men are getting the word. Courses have been set up. They are going well. But under the surface there are things that are holding back the sales effort.

Some of these fears are generated by top level people who fear this, that and other things. They fear the politicians; they fear competition; they fear we are in for a depression.

Unless these things are dragged out by the roots we don't have a chance to fully use what we have. We must spend all official time on ways and means to get our products across with a bang. Not a half-hearted bang. A real bang. We can't do this if we are always wondering how long it will be before we have a depression, how long it will be before an H-Bomb blows us to smithereens.

It has been definitely proven by experiments that people who start out with a faint heart on a job are half licked before they start. It has been shown that when people go at things with zing and confidence they have a head start over their neighbor or their competitor.

We *should* study and keep check on economic conditions. We *should* weigh the future effects of the H-Bomb. And we *should* at all times see that our competition is kept in its proper place—behind us. But we should not let all of this become too much a part of our thinking.

There is such a thing as worrying too much about competition. Valuable time that should be spent on action is often burned up on unnecessary worry. A friend of mine learned this many years ago.

Seems he was always coming in last at track meets in the quarter mile. Each time he dragged himself up to the starting line—taunt and nervous—and ran as fast as he could. But he was always the last one of four or five to reach the tape. Finally he got disgusted and blew off to the coach. What the coach said was a masterpiece. Here it is:

"You were pulling both ways. You were worrying about those in front and in back. At least you finished. Many of those behind you did not. But you should have spent all your energy trying to reach the tape first."

Let's reach the tape first and take all the possible future events in our stride. If we don't do this, and sell ourselves and our products, we will have the very things we fear.

Tom C. Campbell

Editor

NEW! MONEY-SAVING CROCKER-WHEELER BRAKE

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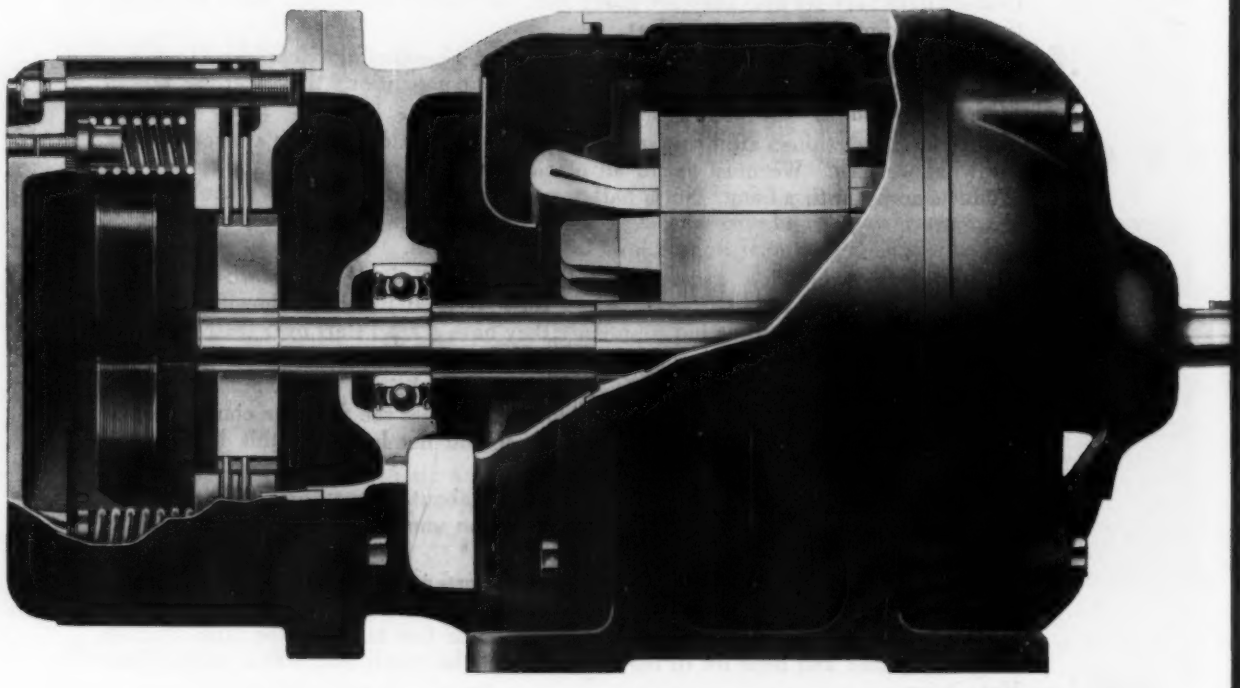

Now—from the pioneer in motor improvements comes a Brake Motor engineered a step ahead of any in its field... to bring you maintenance savings never before possible!

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With its short overall mounting dimension, the brake can be used where space is limited. Brake unit is available for separate mounting—the only brake that can be attached to a standard double shaft D flange motor for frames 203-326 or C face motor for frames 364-405. Get all the facts on the many money-saving features of the new C-W Brakemotor. Send today for new Bulletin. Simply mail the coupon on the opposite page.

Ingot Rate Rebounds To 90 Pct

Consumers Press for Delivery

Scrap Market Showing Strength

The Iron Age SUMMARY

IRON AND STEEL INDUSTRY TRENDS

THERE is no chance of making up steel production lost because of the coal strike in the near future. This week mills are telling their customers that it will be 2 or 3 weeks before deliveries return to normal. And one of the hardest hit mills is telling its customers to add at least 30 days to pre-strike delivery dates.

However, the industry is rapidly shaking off the effects of the coal strike on its production. This week ingot production is scheduled at 90 pct of capacity, up 17 points from last week. The efforts of the steelmakers are being spurred by unrelenting demand.

Although the sound and fury behind steel demand is somewhat diminished, the underlying pressure is still very strong. Some large steel consumers have their bird dogs working overtime, trying to line up new sources of supply and increase quotas with their suppliers, wherever possible. This is causing some squawks from smaller steel users. Some of this always happens in a post strike period.

Consumers Serious About Needs

A tip-off that consumers are really serious about their need for steel is the tremendous pickup in alloy orders. Some mills are comparing the current demand for alloy with that of 1948. Alloy order books of most companies are pretty well filled through the second quarter. This is significant because wartime expansion of alloy steelmaking capacity was believed to be far in excess of potential peacetime demand. Steelmakers say the resurgence of demand for alloy is caused by: (1) consumer willingness to pay extra for alloy because they can't get all the carbon steel they need, and (2) steadily expanding applications for alloy steel.

Most steel consumers didn't reach the bottom of their inventories during the coal crisis. With some notable exceptions, they are more inconvenienced than they are distressed. But those who did hit bottom are really hard up, and they are not getting the steel they need right now. Their situation will take a rapid turn for the better when normal deliveries start reaching them in the next few days.

The end of the coal crisis has not signaled a halt to conversion activity. Hardly a day goes by that someone doesn't pop up looking for rolling mill space to convert semi-finished steel into the products they need.

Autos Setting Hot Pace

The auto makers are setting a hot production pace, except for strikebound Chrysler. Each is trying to grab off as big a share of the market as possible. General Motors Corp. has the added incentive of trying to fill their dealers' showrooms with cars before they hit the Mar. 29 deadline with the United Auto Workers. Most auto firms have learned long ago that a big stock of cars is a pretty good bargaining weapon.

Judging from comments heard this week, steelmen are worrying more about the future demand for autos than the auto people are. They admit that the industry looks good for another 2½ months of all-out production. But, after that, they are worried. They point out that if the market for autos becomes saturated, steel orders from auto companies will drop out of sight. The same is true of appliances.

Last year the steel industry prophets were only partly right. Auto demand held fairly strong throughout the year. The appliance market did become glutted, but the production cutbacks were too sharp and severe shortages developed again later in the year. Some companies lost plenty of business by correcting their inventories too far. They are still struggling to rebuild them.

Scrap Market Advances

The scrap market showed its best strength in recent weeks. No. 1 heavy melting steel advanced $1.00 a ton at Chicago and 50¢ a ton at Pittsburgh. This boosted THE IRON AGE steel scrap composite price by 50¢ a ton to $27.92 a gross ton, a new high for the year. Despite the firmer market undertone, movement is reported only fair and mill buying is still cautious. This indicates there will probably be no early price breakthrough in this market.

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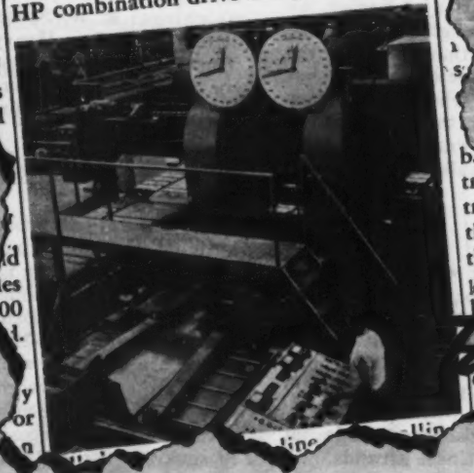
Completely mechanized handling equipment, also engineered by Farrel-Birmingham, enables two operators to manipulate the bar on both sides of the mill and also regulate roll speed and gauge, all from two control desks.

The system for handling the ton-weight bars employs vacuum pilers and unpilers traveling over the entry, delivery and transfer tables. The bars are lifted from the transfer table to the entry table of the mill where a hydraulic sticker assures positive entry of each bar into the roll bite. After the pass, a kick-off device removes the bar to one of the transfer tables. From the transfer tables, the bars are stacked by vacuum pilers and later returned by chain transfer to the entry side of the mill for a succeeding pass, or delivery to the annealing oven.

The mill itself, which is proportioned for great strength, has double motor screwdown, equipped with a magnetic clutch that provides independent operation of either screw or simultaneous adjustment of both. Dial indicators show gauge readings in both thousandths and fractions of an inch. Universal spindles connect the mill rolls to the Farrel 2,000 HP combination drive and pinion stand.



For more complete details of this unique installation, write for a copy of Bulletin 31-M-493.

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Fatigue Cracks

By Charles T. Post

Lafayette, We Are Here

It looks like the Communist drive to have Coca Cola banned from France, as a menace to the French wine industry, has fallen flatter than an uncapped Coke.

But when it looked as though the French National Assembly were going to pass the ban, Jim Farley, chairman of Coca Cola Export, fairly fizzed.

"I'm afraid General Lafayette would think this decision was small reward for General Marshall's plan. . . . It was the favorite drink by choice of the men who saved France . . . if the U. S. Congress were as nationalistic as the French, they'd immediately bar French wines as seductive to American morals," he was quoted as saying.

Side by side with news of H-bombs, escaped leopards, mercy killings, and the British elections, it points up how grim life on this particular globelet of our neat little universe has become. According to our interpretation of Farley, we Yanks have been fighting since the American revolution to make the world safe, not for democracy, but for Cokes. And when we see how close we've come to failing, it almost makes us want to throw in the sponge and submit to . . . well, French wines.

Statie

The other day we dropped in to see The May Co., the remarkable organization that fills the mails with luring letters to entice new subscribers to your f.f.j. We found the girls squaring stacks of newly processed letters, their arms neatly looped with bracelets made of Christmas tree tinsel strands.

"Sort of late for Santa," we suggested.

"Santa, nothing," they replied. "The tinsel draws the static electricity from the sheets of paper so they'll slip together easily."

Puzzler

We didn't submit it to laboratory test, but W. L. Jackson says that if you tear that sheet of paper mentioned last week 50 times and stack it up, you'll get a pile 17,769,885+ miles high. We forgot to mention that the cost of John Bigler's horse in the Mar. 2 issue was $80, but the following have figured it out for themselves, so far: J. W. Foster, Ingersoll-Rand Co.; John L. Vaupel, Barium Steel Corp.; Charles G. Heilman, Commonwealth Industries; M. V. Dreyspool, steel products, New York; K. S. Frazier, Detroit Steel Products Co.; and H. Kelsea Moore, Eaton & Howard.

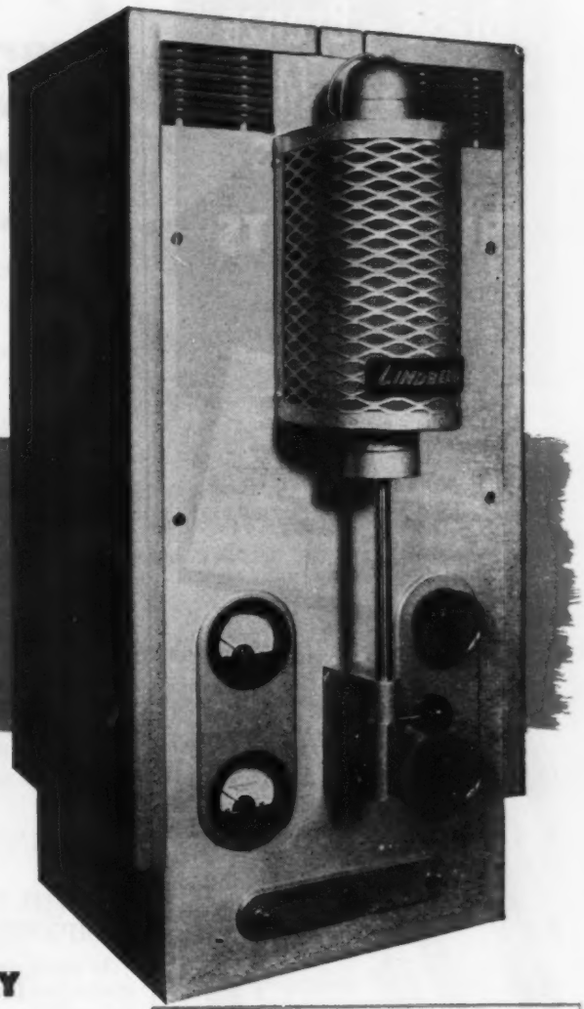
Here's a supplement to the list of those who managed to separate the heavy billiard ball in two weighings: R. W. Stevenson, Armstrong Cork Co.; Henry Chandler, Vanadium Corp. of America; Martin Baron, Sears Roebuck; Richard Dyner, Marathon Foundry & Machine Co.; Myron Bowerman, Homeworth, Ohio; and W. R. Johnson, Armour Research Foundation.

The billiard ball problem brought to mind the following to Messrs. Bowerman, Chandler and Johnson, each of whom submitted it in slightly different form: Given a simple balance and 12 coins, 11 of which are of equal weight but one being either over-weight or under-weight; what is the minimum number of weighings necessary to surely separate the odd coin and identify whether it is over-weight or under-weight?

NOW...

CARBON ANALYSIS

in a FLASH



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For further details ask for Bulletin 910.

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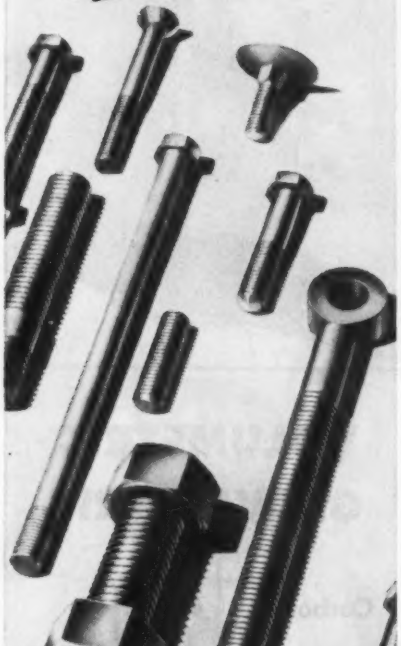

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Dear Editor

AUTHORESS AND READER

Believe it or not, I am still getting letters from people who have just happened onto my article on quality which appeared in Sept. 4 issue. They must hoard their copies of THE IRON AGE through the good weather and then spend the cold winter months reading. The puzzles in "Fatigue Cracks" have been very interesting; I worked the one about the marbles and received my copy of that excellent compilation of data, The Metal Industry Facts Issue. This is already one of my most-used reference books, and after I quote some figure it is gratifying to have people comment, "From IRON AGE? That must be right." There is only one suggestion I could make, namely, that the description in the Index be a little more complete. This would save quite a bit of time.

REBECCA H. SMITH
Chief Metallurgist
Turbodyne Corp.
Hawthorne, Calif.

ARE THE BIG STEEL COMPANIES HEARTLESS?

In these days of strikes, threatened strikes and general labor unrest the following true story is a refreshing incident.

The story was forcibly brought to my attention one day about 3 months ago by our family doctor telling about a case of his involving a young man in his early thirties. It seems this man was an average individual selling steel for a living. He is a salesman for the Ryerson Steel Co. and by no means one of their better men.

This salesman was a veteran, had held his present position only since the war, and, in fact, had only worked for this company since he was discharged from the Army.

He first noticed something was wrong with his health when one evening he felt tired and sick and decided he would take his temperature. It was up a little from normal but he didn't think too much about it. After walking around feeling sick for about a week he consulted his doctor and was immediately put to bed for a period of 3 weeks. He seemed to recover after this time and went back to work only to end up in the hospital for another 3 weeks in bed.

All during his illness the company paid his full salary and he was not only thankful for this but was glad to get back on his feet and back to work.

Then after only a few weeks on the job he became ill again and finally the doctor was able to diagnose his trouble as rheumatic fever and recommended a complete rest for 2 to 3 months. This salesman had no savings and could see no way of taking this much time off and still continue to support his family, until he explained his problem to his employer.

Did they tell him they could not continue to pay his salary for this extended period of time? They did not! The company explained they had a large investment in this salesman in both time and money and they would not only give him time off to recover but would pay his full salary as well.

Is this a business proposition as far as the steel company is concerned? It is! It is a business investment just as surely as though they paid out the same amount of money for additional inventory. They expect a return on their investment which will be realized when this salesman has recovered from his illness.

The return will take the form of increased loyalty to his company and a better, more efficient employee. It is not only a dollar investment but an investment with a heart.

How do I know so much about this company and about this salesman? I am that salesman!

R. M. DELAND
Ryerson Steel Co.
Gardena, Calif.

SCRAP GRADING

We would like to get a copy of the specifications covering the grading of No. 1 machinery cast scrap iron and also No. 1 agricultural cast scrap iron.

C. O. HAGEN
Purchasing Agent
Minnesota State Prison Industries
Stillwater, Minn.

All of the various specifications governing scrap iron and steel are contained in the year book of the Institute of Scrap Iron & Steel, Inc., 1344 Connecticut Ave. N. W., Washington 6, D. C. You can secure a copy of this book by writing to them. As stated in Dept. of Commerce Specifications (simplified practice recommendations R 58-36), No. 1 machinery cupola scrap is defined as follows: "Clean machinery cast iron scrap. Must be cupola size, not over 24x30 in. in dimensions, and no piece to weigh over 150 lb." Agricultural scrap is defined as follows: "Cast iron parts of agricultural machinery, including plow points. Must be free from steel, malleable, and full-chilled iron." Nomenclature and trade practice vary somewhat from market to market, and in special understandings between buyer and seller.—Ed.

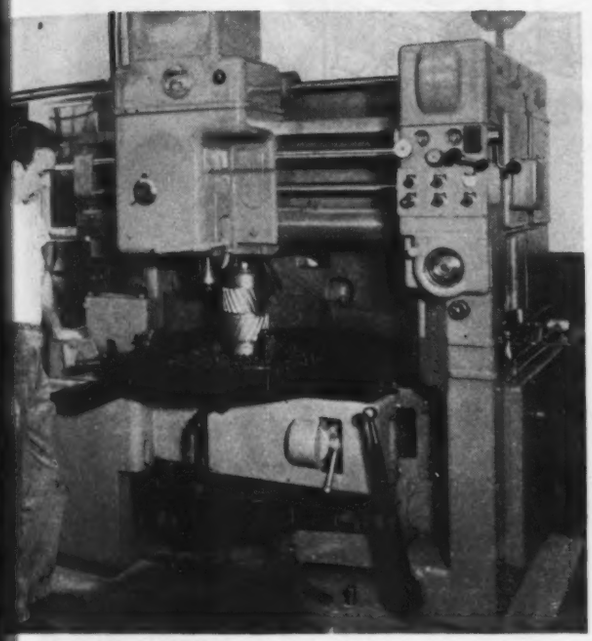
WE'RE STUMPED!

Can you please advise us who now manufactures the Nazel Hammer formerly made by the Nazel Engineering Works of Philadelphia.

J. A. SMITH
Smith-Stewart Co.
Newburgh, N. Y.

Readers having information on this item may contact Mr. Smith at Smith-Stewart Co., 223 Broadway, Newburgh, N. Y.—Ed.

Growl... FOR MARINE PROPULSION



The Fellows No. 36 Gear Shaper installed for cutting production-run quantities of speed reduction and reverse gears at Snow and Nabstedt Gear Corp., New Haven, Conn.

The massive rigidity of this big No. 36 Gear Shaper opens up broad avenues of time saving in the cutting of heavy-duty precision gears with helical, spur or herringbone teeth... Power to hog out stock and precision to hold finish cuts to "tenths"... Speed and feed changes made in seconds... Well worth investigating! Complete literature on request.

ROUGHING AND PRE-SHAVING PERFORMANCE

at Snow & Nabstedt Gear Corp., New Haven, Conn. — manufacturers of S-N Marine Reverse and Reduction Gears.

•

WORK: 57-tooth Herringbone Gear, 14.250 inches P.D.... and 25-tooth Mating Pinion, 6.250 inches P.D. (both SAE 8620 steel)

TOOTH CHARACTERISTICS:

Diametral Pitch	4/5
Pressure Angle	20 degrees
Helix Angle	23 degrees
Face Width	3.375 inches
Whole Tooth Depth	.475 inches

GEAR SHAPER SETTING:

Strokes per minute	86
Feed per stroke	.0225 inches

ROUGHING TIME:

(Material Normalized Prior to Cutting)

Gear (in one cut)	26.5 minutes
Pinion (in one cut)	13.5 minutes

PRE-SHAVING:

(After Carburization)

Gear (in one cut)	23.5 minutes
Pinion (in one cut)	10.5 minutes

SAME GEARS SHAVED ON FELLOWS SHAVING MACHINES with minimum stock removal, minimum correction needed.

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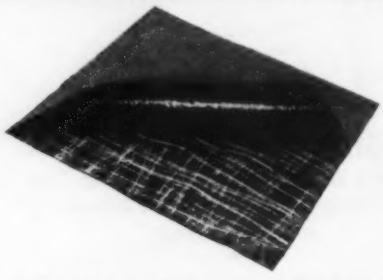

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Dear Customer

by

Jack R. Hight

TIME MEASURES THE TIDE—The tide of enthusiasm for various magazines by readers in industry has recently been measured by our slick contemporary, *Time*. According to what we are told, they polled the customers and prospects of industrial firms (many of them in the metalworking and metalproducing industry) to find out what they read.

The questions on the ballots weren't intended to bring out the value of business papers of our type, but you'd be pleased as were we, to know how well we stood the test. There were three industrial magazines that drew more than 4 pct of the votes, IRON AGE highest among them with 7.9 pct, was 10th in the overall ranking. You'd be surprised at how many of the big, powerful general circulation magazines fell below that mark. We are sure that if the questions had been equally designed to bring out business paper information readership as well, that we would have ranked even higher.

HEADY WINE—From time to time we have been guilty of a little carping criticism here. We weren't actually against civilization, we just didn't care much for how it was going. This week celebrates our first anniversary in writing this little column. As a matter of fact the mortality rate among the writers of such material is very high.

Thus it is a triumph indeed to just exist as Dear Customer for that long. But now, to find ourselves here in the rarified atmosphere in the front section of THE IRON AGE, is to feel that we have arrived. No longer are we the 42nd St. pariah, the editorial untouchable, ever in danger of being crowded off the back page.

This becomes a time for a rededication, a reconsecration of our typewriter soul to the job at hand. We hope to go on finding out interesting things about this and other copies of THE IRON AGE and its people and to tell you about them.

PROFIT SHARING—Next week will bring you the next IRON AGE Special Report, this one a humdinger relating the experience of three companies in the field of operating profit sharing plans for employees. The history of such plans, their successes and their failures, plus a detailed account of the operations as mentioned above will be included. Walter Patton, Detroit Regional Editor gets the basic credit for the work that has gone into this job.

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Latest Type Niagara No. 1214 Power Squaring Shear

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GLOBAL LETTER

REVIEW OF WORLD MARKETS

Recent disturbances in world steel market partly due to German efforts to raise permitted level of steel output. . . . France attains maximum pre-war production.

Geneva—The world steel market in the last few months has been marked by drastic declines followed by a partial rebound of export steel prices. Prices as low as $40.00 per ton for steel bars had been obtained in contracts placed late last year, in spite of the fact that there was and still is a world steel shortage.

According to steel committee members of the United Nations Economic Commission meeting here, the recent disturbances in the international steel market, have been due partly to German efforts to impress the Allies with the need for an increased ceiling on steel production.

Effort Has Chance of Success

The new German effort has a partial chance of success. One American official said that he is in favor of at least increasing the permitted level. He also hinted that the German shipbuilding level be increased. The British are not exactly pleased with the idea and the French may be assumed to definitely oppose it. How much of this opposition is based on security and how much on politics is difficult to determine, the American official stated. In any event, he added, the present German steel level is not going to remain that way forever.

Up to January of this year, steel could easily be obtained at $50.00 per ton. Six months before that the same qualities brought $85.00 to $100.00 per ton. In the last few months prices have gone up and production in such sensitive export quarters as Luxembourg has increased.

The steel experts claim that this series of events came about because due to a lack of orders, German steel output in the fall of 1949 began to drop from a 10 million ton yearly rate to 8 million. The drop came when the Germans started to obtain capacity limits above the 11.1 million ton level set by the inter-Allied agreement of 1946.

Didn't Count on Competition

German steel at drastically cut prices was offered in South America, Italy and the Far East. Output increased as orders rose. German output is again approaching the 11.1 million ton yearly rate, although renewed buying by German railroads and other domestic users has made the need for exports at any price less urgent.

What the Germans did not figure on was the competitive reaction of Belgian and Luxembourg steel exporters, the steel experts say. These countries for the past year or so have been undergoing a strange experience for Europeans. They have been competing actively without the restraining influence of a cartel agreement.

Therefore as German prices fell, Belgian prices fell further. A stream of export orders resulted from buyers who thought the bottom price had been reached. This according to the steel experts is what caused prices to fall so drastically and the market to become upset.

However, European steel prices are once more on the upturn.

France Regains Production Level

Paris—Four years after liberation, France has regained her maximum (1929) pre-war industrial level, according to a report of the Monnet Modernization and Equipment Plan Commission. After the First World War it took France six years to achieve comparable results.

This rapid recovery is due to an increase in manpower of 300,000 workers and an increased work week of 45 hours as against 39 in 1939. Production per man-hour, which in 1946 was 25 pct below the pre-war level, has now returned to normal.

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VARIABLE SPEED TRANSMISSION for providing infinite, accurate speed flexibility over a wide range—2:1 to 16:1. Sizes—fractional to 87 hp.

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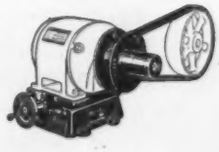
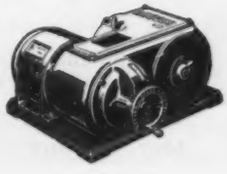


MOTODRIVE combines motor, speed varying mechanism and reduction gears in single unit. Speed variations 2:1 to 6:1 inclusive. Sizes to 20 hp.



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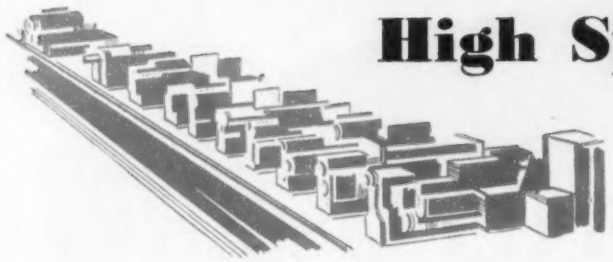


Sales Inquiries and Production

First quarter machine tool orders may hit $1 million . . . January volume highest since fall of 1946 . . . All types in demand.

by William A. Lloyd

Cleveland—First quarter order volume of $80 million was predicted for the machine tool industry this week by spokesmen for major segments of the industry.

New order volume in January was the highest since the fall of 1946, according to National Machine Tool Builders' Assn. February orders, according to trade estimates, were about 10 pct under January levels.

Estimating January orders at about $29 million, and February orders at about $25 million, it is apparent that March business on the level of the past two months will assure an $80 million first quarter. March is a seasonally high month for the machine tool industry. In 1949, the March index of new orders, as reported by NMTBA was 73.6 compared with 78.7 for January.

Reports Indicate Active Demand

Reports from major sales areas indicate an active demand for practically all types of machine tools, but the spread of orders, on a company by company basis, is spotty and uneven.

In Detroit the Chrysler strike has pulled a curtain over some buying segments of the industry but the interest in time-saving and money-saving machine tools goes on with no evidence of slackening.

For the moment, the Chrysler V-8 program appears to be stalemated, but there is considerable activity in six-cylinder engine planning that is expected to be reflected soon in requests for new tool quotations.

Studebaker Continues Buying

Meanwhile, some additional Studebaker buying has been reported. Ordering for the Studebaker block and head is believed to be about completed.

Activity at Mound Road for the new Ford-Cincinnati transmission plant is going forward and orders for the six-cylinder job at Cleveland continue to come in, according to trade sources.

Other important local activity includes new tooling for the Detroit transmission div. of General Motors. Some of this equipment is scheduled for delivery within the next 30 days.

B-36 Produced at Fort Worth

In Washington, in reply to rumors that production of B-36 bombers was being reactivated which would increase machine tool business, an Air Force spokesman said it is impossible to reactivate B-36 production, because it has been and is now in active production at Fort Worth, Tex. It is believed the rumors resulted from recent daily newspaper stories which stated that the Air Force was going to drop B-52 plans and expand B-36 production instead. At that time the Air Force issued a statement pointing out that no such decision had been made and that design work on the B-52 was going ahead at Seattle.

Net Income Dips

In Hartford, Conn., Niles-Bement-Pond Co. reported consolidated net income of $990,212 for 1949, equal to $1.25 a common share. Net compares with $1,219,960 or $1.54 a common share in 1948. Net sales declined last year from $22,334,068 to $21,030,907. Frederick U. Conrad, president, in his report to shareholders, stated that 1949 started out with the threat of a slight business recession. Business fell off for the machinery division and the small tool and gage division and management embarked on an inventory reduction program which was a complete reversal of the trend of recent years. Export sales also declined, due to devaluation of the British pound, Mr. Conard pointed out.

Buffalo Forge Also Drops

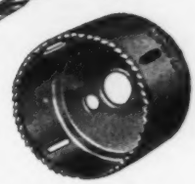
In Buffalo, the Buffalo Forge Co. and subsidiaries reported a profit of $2,015,099, equal to $6.20 a share, for the fiscal year ended Nov. 30. Net compared with $2,132,884 or $6.57 a share, in 1948. Net sales in 1949 increased slightly to $19,094,537 from $19,034,094 in 1948.

Although unfilled orders at the close of 1949 were at a lower level than at the end of 1948, orders received during the latter part of the year and thus far in the first quarter of 1950, both domestic and foreign, have been encouraging and the present situation with respect to orders booked, but not shipped, is considered satisfactory, the annual report stated.

Cut...

LARGE HOLES

... thru any machineable material up to 1⅛ *INCHES* thick!



Here is a premium tool which makes it possible to saw holes in one short operation ... large holes which heretofore had to be laboriously machined "a-chip-at-a-time."

MARVEL High-Speed-Edge Hole Saws have strength to withstand the terrific peripheral strains of heavy duty operation in lathes, drill presses or portable power tools. They have a high speed steel cutting edge which is electrically welded to a tough, alloy steel body, high speed steel pilot drills, heavy hexagonal shanked arbors and sufficient set for deep drilling. They are self-aligning, as the larger diameter saws float on their arbors and are driven by double drive pins. They will saw round holes accurately in any machineable material.

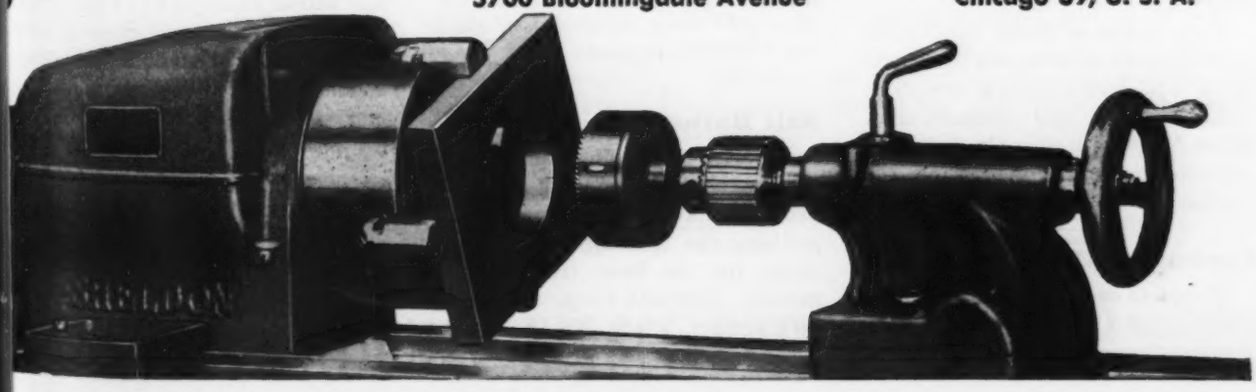
MARVEL High Speed-Edge Hole Saws come in 35 sizes, from ⅝" to 4½". They are carried in stock by leading industrial distributors.

WRITE FOR BULLETIN ST-49

"MARVEL" *has Always had the edge!*

MARVEL *Metal Cutting* **SAWS**
Better Machines—Better Blades

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 Bloomingdale Avenue **Chicago 39, U. S. A.**



FREE — USE POST CARD

PUBLICATIONS

New publications that describe money saving equipment and services are available free and without obligation. Copies can be obtained by filling in the attached card and mailing it.

Forged Flanges

Drop-forged pipe flanges in all types, such as Van Stone, blind, slipon, screwed companion, reducing and buttwelding, are shown in a 32-p. catalog, which also lists complete specifications, chemical composition of material and physical properties. *Harrisburg Steel Corp. For more information, check No. 1 on the postcard.*

Portable Power Units

A new 4-p. bulletin contains information contributed by users of the Model-C portable power threaders, telling where they used it and what effect the Beaver unit had on their operations. *Beaver Pipe Tools, Inc. For more information, check No. 2 on the postcard.*

Measuring Instrument

The Pocket Comparator, a precision optical measuring instrument for the inspection of small parts, is calibrated for measuring widths, lengths, circles, radii and angles, as described in a new 4-p. folder. *National Tool Co. For more information, check No. 3 on the postcard.*

Power Punch Press

Two models of Emco bench type power punch presses are described in a 4-p. folder listing specifications, features and common uses. *Klaas Machine & Mfg. Co. For more information, check No. 4 on the postcard.*

Carburizer-Nitrider

Complete descriptions of the construction and operation of the Hevi Duty carburizer-nitrider are given in a 28-p. bulletin, which also shows a number of installations in a variety of industries. *Hevi Duty Electric Co. For more information, check No. 5 on the postcard.*

Threadless Couplings

How Dresser No-Thread pipe fittings made possible a reduction of 60 to 65 pct in time required for installing piping on a blast furnace during repairs following a breakout is described in a 4-p. folder. *Dresser Mfg. Div. For more information, check No. 6 on the postcard.*

Cutting Machines

Seven models of Pullmax plate and sheet cutting machines are described and illustrated in a 6-p. folder listing specifications and capacities. *American Pullmax Co., Inc. For more information, check No. 7 on the postcard.*

Salt Baths

A series of technical data sheets for metal treating and finishing products have been prepared, describing the Heatbath line of salt baths for the heat treatment of metals. *Heatbath Corp. For more information, check No. 8 on the postcard.*

Roll Feeds

Littell single and double rack and pinion drive roll feeds are shown in an 8-p. booklet illustrating applications and giving specifications. *F. J. Littell Machine Co. For more information, check No. 9 on the postcard.*

Machine Tools

A number of Delta-Milwaukee production machine tools and accessories are presented in a 32-p. catalog, which also contains a price list. *Power Tool Div., Rockwell Mfg. Co. For more information, check No. 10 on the postcard.*

Hobbing Machine

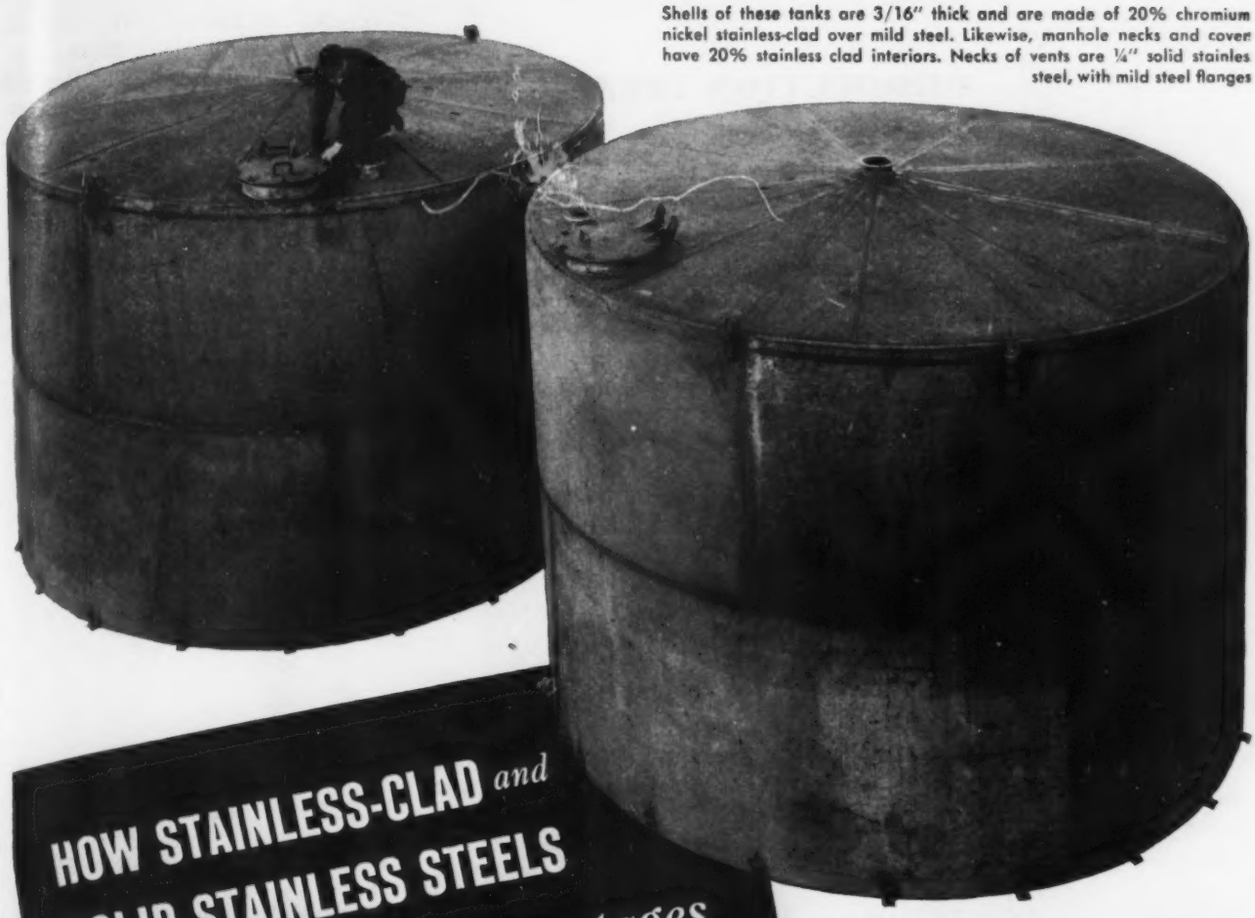
The Barber-Colman No. 14-15 hobbing machine for high production in accurate cutting of spur and helical gears up to 14 in., spline shafts, sprockets and other hobbed forms, is described in a new 10-p. booklet. *Barber-Colman Co. For more information, check No. 11 on the postcard.*

Punches and Shears

Beatty single and double power punches, multiple punches, spacing tables, horizontal punches, bar shears, structural punches, and

Turn to Page 141

Shells of these tanks are 3/16" thick and are made of 20% chromium nickel stainless-clad over mild steel. Likewise, manhole necks and cover have 20% stainless clad interiors. Necks of vents are ¼" solid stainles steel, with mild steel flanges



HOW STAINLESS-CLAD *and* SOLID STAINLESS STEELS *Provide Vital Advantages for Beverage Storage*

This interior view of a hoisted tank shows the solid stainless steel angles used for top bracing.

Complex needs of the beverage processing industries have led to the use of several different chromium-nickel stainless steels to solve specific corrosion problems...

But corrosion resistance is only one of the many virtues of austenitic chromium-nickel stainless steels.

In addition, they are readily fabricated, may be welded with ease and are highly resistant to impact and wear. Parts made of these stainless steels are easy to clean and keep clean.

Charles T. Brandt, Inc., of Baltimore, Md., constructed the two 25,000-gallon storage tanks shown here of Type 304 stainless-clad and solid stainless. The tanks are adequately strong, are corrosion resistant, and do not contaminate the stored syrup.

Leading steel companies produce chromium-nickel stainless steels in all forms such as sheet, strip, bars and tubes. A list of sources of supply will be furnished on request.

Choice of the correct type for your application assures longer service life, fewer repairs and minimum maintenance.

Over the years, International Nickel has accumulated a fund of useful information on the properties, treatment, fabrication and performance of engineering alloy steels, stainless steels, cast irons, brasses, bronzes, nickel silver, cupro-nickel and other alloys containing nickel. This information is yours for the asking. Write for "List A" of available publications.

EMBLEM OF INCO SERVICE TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

NEW PRODUCTION IDEAS

Continued

rests, built into the side frames between the guides, hold the ram when changing dies or working be-

tween dies. A steel bolster plate on the anvil equipped with T slots makes for rapid and accurate setting of dies. Production is increased due to the time saved in lining up and checking match of the dies. Shock insulating features cushion vital parts, resulting in low maintenance costs. *Chambersburg Engineering Co. For more information, check No.* 32 *on the postcard on p.* 37.

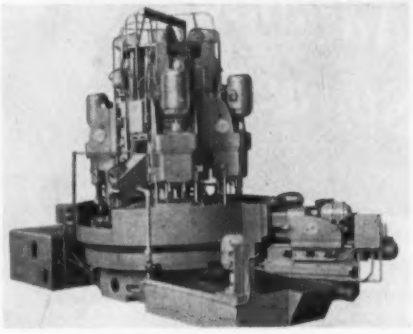
Rolling Pressure Gage

Measuring the rolling pressures on continuous strip mills is possible with the new P&W Electrolimit Pressure Block Gage. The pressure blocks are mounted on the mill

housing between the top bearing and the screw or between the bottom bearing and the housing. Two gages are required for each mill stand. One gage is on the drive side and the other is on the operating side. The pressure measurement is obtained by accurately measuring the compression of a ring and this measurement is converted to pounds pressure through the medium of the testing machine. A temperature compensator incorporated in the gage maintains accurate readings over a wide temperature range. Capacities of the gages range from 5000 lb to 3 million lb. *Pratt & Whitney, Div. of Niles-Bement-Pond Co. For more information, check No.* 33 *on the postcard on p.* 37.

Drilling Machine

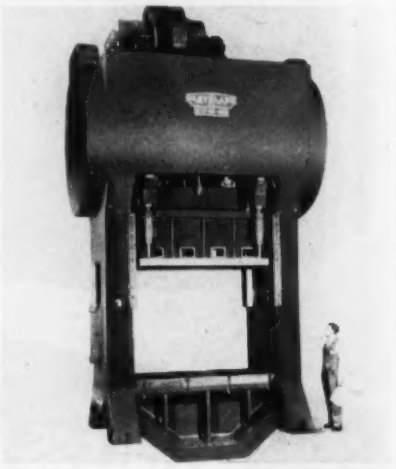
Roto-Matic power heads are incorporated in a vertical indexing machine that drills and reams two suspension holes and the king pin hole of automobile front suspension support arms. The power heads, in both vertical and horizontal



mounting positions, have a mechanical electrical feeding mechanism, embodying the use of a feed screw. Change gears provide varying feed and spindle speeds. The machine has five work stations and one loading station and indexing is accomplished through a hydraulic mechanism. Lubrication is automatic. A panel of pilot lights provides a continous check on the operations of the machine. *Davis & Thompson Co. For more information, check No.* 34 *on the postcard on p.* 37.

Toggle Press

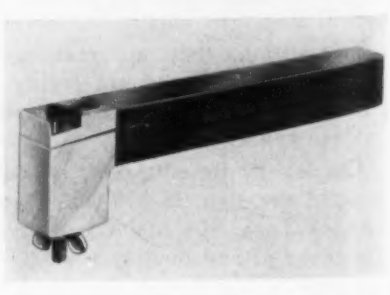
This double crank double action toggle press has twin drive and is equipped with single station electrically controlled air operated drum type friction clutch with spring loaded brake. The flywheel has an auxiliary air brake and both the slide and blankholder are air counterbalanced. The inner slide has a stroke of 33 in. and the blankholder slide a 22-in. stroke with 8-in. adjustment being provided for both. Bed area is 60x96 in. and capacity rating is 400 tons for inner slide and 250 tons for outer



slide. *Cleveland Punch & Shear Works Co. For more information, check No.* 35 *on the postcard on p.* 37.

Ejector Tool Holder

Hard chrome plating of the heads of a new line of standard ejector tool holders for solid carbide inserts is said to increase the life of the holder up to 500 pct by eliminating chip erosion. A new method of clamping gives controlled clamping action and stress-free, rugged support of the blade. The locking screw is on top of the holder, easily



accessible for fast insert interchange without removing the holder from the tool post. Wing nut on the bottom eliminates the need of a wrench in locking the adjusting screw. A knock-out hole permits

Turn to Page 143

Iron Age *Introduces*

DELBERT G. FAUST, chief engineer, C. A. Norgren Co.

ARTHUR L. FLECK, general sales manager, American Screw Co.

H. WARD LEWIS, manager of operations, Pittsburgh Limestone Corp.

Delbert G. Faust becomes chief engineer of the C. A. NORGREN CO., Denver. In his new capacity he will be in charge of all research and engineering activities in the development of new and improved products.

James F. Dailey became purchasing agent of NATIONAL TUBE CO., Pittsburgh, succeeding **G. Glenn Goe** who has retired after 49 years of service. Mr. Dailey has been serving as assistant purchasing agent.

John F. Cooney, manager of personnel administration activity for the central controller's office of the FORD MOTOR CO., has been promoted to manager of employee services for the industrial relations department of the Ford Division.

Arthur L. Fleck was named general sales manager of the AMERICAN SCREW CO., Providence, succeeding the late **Charles O. Drayton.** Mr. Fleck had been assistant to Mr. Drayton for many years, and for the last ten served as manager of the company's Chicago office and warehouse.

Thomas I. Crowell, Jr. and **Charles B. Cooke** have been elected vice presidents of FORD, BACON & DAVIS, of New York, Chicago, Philadelphia and Los Angeles.

F. Carl Saacke received the appointment as safety engineer for the AIR REDUCTION CO. He will review equipment used and sold by the company for safety factors and will be concerned with plant safety programs and employee interest in these programs.

Ralph E. Larry, vice president of the PITTSBURGH LIMESTONE CORP., has transferred from New Castle, Pa., to the company's general offices at Pittsburgh. At the same time, the company announced the promotion of **H. Ward Lewis** to manager of operations with headquarters at New Castle. Other changes include the promotion of **J. N. Suliot** to assistant manager of operations at New Castle, and appointment of **Howard W. Gibbs** to succeed Mr. Suliot as superintendent of the company's Moler Dolomite Quarry at Millville, W. Va.

Roland J. Schmitt was recently named manager of the New York territory for E. C. ATKINS & CO., Indianapolis. He succeeds **E. S. Norvell** who is retiring.

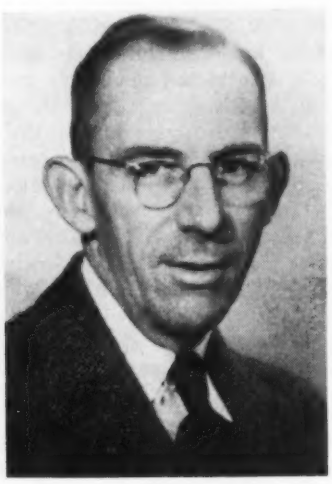
Iron Age *Introduces*

Continued from Page 51

R. S. Deemer has been appointed production manager and **H. M. Conner** credit manager of the Republic Rubber Division, LEE RUBBER & TIRE CORP. Mr. Deemer, formerly assistant sales manager, replaces **H. W. Croysdale**, who has resigned, while Mr. Conner advances from the position of assistant credit manager.

Ernest R. Baxter was promoted from director of sales and sales administration to assistant vice president for CARBORUNDUM CO., Niagara Falls, N. Y. **Frederick W. Bonnacker**, who had served as sales manager of the coated products division, was named general sales manager of the company and **Fred W. Scott, Jr.**, moved from assistant sales manager to sales manager of the coated products division.

Joseph G. Brady was appointed to the position of district sales manager for small tools and gages in the New York territory for PRATT & WHITNEY, Division Niles-Bement-Pond Co., West Hartford, Conn. He is succeding **J. C. Molinar** who became sales manager of small tools and gages. The company has also announced the following recent additions to the machine tool sales staff of the New York office: Messrs. **John R. Batterson, Harry Randall** and **Denison C. Fuller.** Added to the machine tool sales staff of the Chicago office is **Arthur J. Laducer**; and to the San Francisco and Los Angeles branches, **P. D. Brown.**



JOSEPH G. BRADY, district sales manager for small tools and gages, Pratt & Whitney Co.

PAUL VAN WAGNER, vice president sales, Copperweld Steel Co.

Paul Van Wagner was recently appointed vice president in charge of sales for the COPPERWELD STEEL CO., Glassport, Pa. He will handle the company's domestic and foreign marketing operations. Mr. Van Wagner formerly directed Copperweld's export division, with headquarters in New York. Prior to that he was manager of sales covering the eastern part of the United States. **William W. Ege** will take over the responsibilities of the newly created post of vice president and chief engineer. **P. A. Terrell**, assistant vice president, has been promoted to the post of vice president. He will be responsible for Federal government activities. **Henry Oberle**, who has been Copperweld's eastern district sales manager, is appointed utility sales manager.

A. H. Schmeltz becomes manager of ALUMINUM COMPANY of AMERICA'S newly-established patent department. Alcoa's patent activities were formerly a part of the company's research laboratory organization. Under the new arrangement, the patent department will report directly to the general management of the company.

William A. Maharry was appointed assistant manager of public relations for the LINCOLN-MERCURY Division of the FORD MOTOR CO., Detroit. Mr. Maharry was formerly manager of public relations for Curtiss-Wright Corp.'s airplane division.

P. J. McGovern was made director of public relations for the tire division of UNITED STATES RUBBER CO. He will have headquarters in Detroit, where he formerly was in charge of production, education and training activities.

WILLIAM W. EGE, vice president and chief engineer, copperweld Steel Co.

James W. Elizardi has recently been made manager of the Houston sales office for the MARLEY CO., INC., Kansas City, Kan.

Eugene A. Coombs has been appointed export sales manager for the GISHOLT MACHINE CO., Madison, Wis., and will take up temporary residence in Paris. **Robert H. Bruce** is assuming Mr. Coombs' former duties, and is now assistant general sales manager.

Ernest E. Brayshaw recently became affiliated with CONTINENTAL FOUNDRY & MACHINE CO. in a sales capacity connected with the firm's rolling mill and heavy machinery products. Mr. Brayshaw was formerly with the SOUTHWEST STEEL ROLLING MILLS, Los Angeles.

Carl O. Roeder has been named southern district manager for BROOKS OIL CO. With headquarters in Birmingham, Mr. Roeder will direct sales and enginering activities in the southern states.

Theodore M. Caiazza, freight traffic manager of the SANTA FE RAILWAY at Chicago, was named to fill the newly created position of assistant to the vice president of traffic. **Harvey R. Wright**, assistant general freight agent at San Francisco, will replace Mr. Caiazza, as freight traffic manager at Chicago.

B. W. Stephenson, vice president of SAFWAY STEEL SCAFFOLDS, INC., Detroit, has been elected to the board of directors of FOSTORIA PRESSED STEEL CORP., Fostoria, Ohio.

Raymond E. Wagner has been appointed district manager of the Akron area for the PENINSULAR STEEL CO.

Henry F. Hebley, director of research for the PITTSBURGH COAL CO. since 1939, was made research consultant to the PITTSBURGH CONSOLIDATION COAL CO. In his new post, he will coordinate the company's activities in the control of air and stream polution.

Roger Bowen was named engineering department head for the CANNON ELECTRIC DEVELOPMENT CO., Los Angeles. D. Frank Jackson, who has been acting chief engineer, will continue as chief assistant to Mr. Bowen.

Richard G. Lorraine has been appointed head of a new project in the Knolls Atomic Power Laboratory, operated for the Atomic Energy Commission as part of the GENERAL ELECTRIC Research Laboratory at Schenectady.

James G. Witte became general sales manager for the AMERICAN BOX CO. and the AMERICAN WOOD PRODUCTS CO., Cleveland.

Norman Hill was named manager of service products sales, with headquarters in Bristol, Conn., for the NEW DEPARTURE DIVISION, GENERAL MOTORS CORP. Mr. Hill will coordinate the activities of the New Departure division with that of its service organization, United Motors Service, for the distribution of New Departure ball bearings. Mr. Hill has been with the New Departure sales department since 1942 and most recently served as sales representative in the north central states.

NORMAN HILL, manager of service product sales, New Departure Division, General Motors Corp.

Iron Age Salutes

HARRY M. MOSES

WHEN the mountain goes to Moses it's news. But it's something more. It shows there are still people who enjoy a confidence among their associates that drives cynics crazy.

Yet that is just what the bituminous coal industry did in the case of Harry M. Moses. It has so much confidence in him that soon he will be their chief trouble shooter. Or if you want a more dignified title let's call it coordinator.

Harry will soon leave a U. S. Steel Corp. subsidiary, H. C. Fricke Coke Co., of which he is president. At least that is the way present plans are set. Mr. Fairless and all the other friends Harry has in Big Steel will be sorry to see him go.

They will be sorry not only because he has done a bang-up job in running one of the biggest captive mine setups in the country, but because Harry has a way of getting everyone on his side. He has so many friends around the country that they are hard to keep track of.

The coal industry has needed a top strong man for some time. But how to get him? Coal operators are individualists. They scrap among themselves. They take a dim look at each other many times. And their attitude and language off the record rivals that of steel people.

But when it came to picking out a man who could do something for collective bargaining, for safety and for advancement of the coal industry there was no trouble.

The only trouble came when they tried to sell the idea to Harry. He was at the top of his ladder and coming to the place where things were not quite as tough as they used to be. But Harry Moses is one of those individuals who loves his industry. After a tussle with his inner self he finally decided that even though it probably meant he would end up with the heebie jeebies he agreed to take the job.

His friends, and even John L. who has a reluctant respect for Harry, expect that he can and will do the job. And when he does it will mean a lot to industry in general. It will mean a lot to the metalworking industry. It may even mean the end of these paralyzing stoppages that are yearly driving operation men in steel and other metal plants into a tizzy.

IRON AGE INTRODUCES

Continued from Page 53

EDMUND D. HAIGLER, chief engineer, Fischer & Porter Co.

Edmund D. Haigler recently joined the FISCHER & PORTER CO., Hatboro, Pa., to work on special customer engineering problems. Mr. Haigler has over 20 years experience in industrial instrumentation and recently completed a two-year survey of the mining, milling and smelting industries.

Thomas P. Gallagher has been named assistant sales manager for MUNRAY PRODUCTS, INC., Cleveland. Mr. Gallagher, who was formerly associated with the ATLAS ENGINEERING CO., will assist **Ray W. Grace**, vice president of the company, in a sales expansion program.

A. J. Winkler has been appointed district passenger agent at Houston, in charge of the Houston and San Antonio territories, for the WABASH RAILROAD CO. **M. E. Hohnbaum** became district passenger agent at Dallas.

R. E. Montgomery, who had been manager of the Cleveland district of the automotive, aviation and government division of B. F. GOODRICH CO., is named manager of original equipment sales on off-the-road, heavy duty truck and all types of industrial tires. Succeding Mr. Montgomery as Cleveland district manager is **J. D. Roarty**, who had been manager of the San Francisco district, which is now consolidated with the Los Angeles district where **C. H. Kanavel** is manager. **E. C. Shingleton** has been transferred from the Akron offices, to the Milwaukee district as sales representative.

ALLEN B. WILSON, vice president, Acme Steel Co.

W. F. CRAWFORD, new director of Central Scientific Co.

W. F. Crawford, president of EDWARD VALVES, INC., East Chicago, Ind., has been elected a director of the CENTRAL SCIENTIFIC CO., Chicago. Mr. Crawford is also director of the ROCKWELL MFG. CO., Pittsburgh, and the WASHINGTON STEEL CO., Washington, Pa.

Thomas V. Maloney, state registrar of vehicles for California, has joined the executive staff of the motor statistical division of R. L. POLK & CO., Detroit. His headquarters will be in Cincinnati.

William A. Durbin has been named director of public relations for BURROUGHS ADDING MACHINE CO., Detroit.

W. L. Vande Water becomes sales promotion manager of GENERAL MOTORS CORP., Truck & Coach division. Mr. Vande Water has been with HARRY FERGUSON, INC., for the past six years.

ALEX L. MOLL, vice president, Acme Steel Co.

Allen B. Wilson, who was formerly general manager of producer products for ACME STEEL CO., Chicago, has been elected a vice president of the company. He will continue his activities on new product and market development. Also elected to the vice presidency was **Alex L. Moll**, who was previously sales manager of strip steel. He will head the sales division of strip steel for the company.

OBITUARIES

C. Leon Brown, 50, assistant manager, flanging sales department, Lukens Steel Co., Coatesville, Pa., died on Mar. 3. He had been associated with Lukens since July 1926.

William A. White, 66, for the past 25 years general sales manager of Orr Iron Co., Evansville, Ind., died recently.

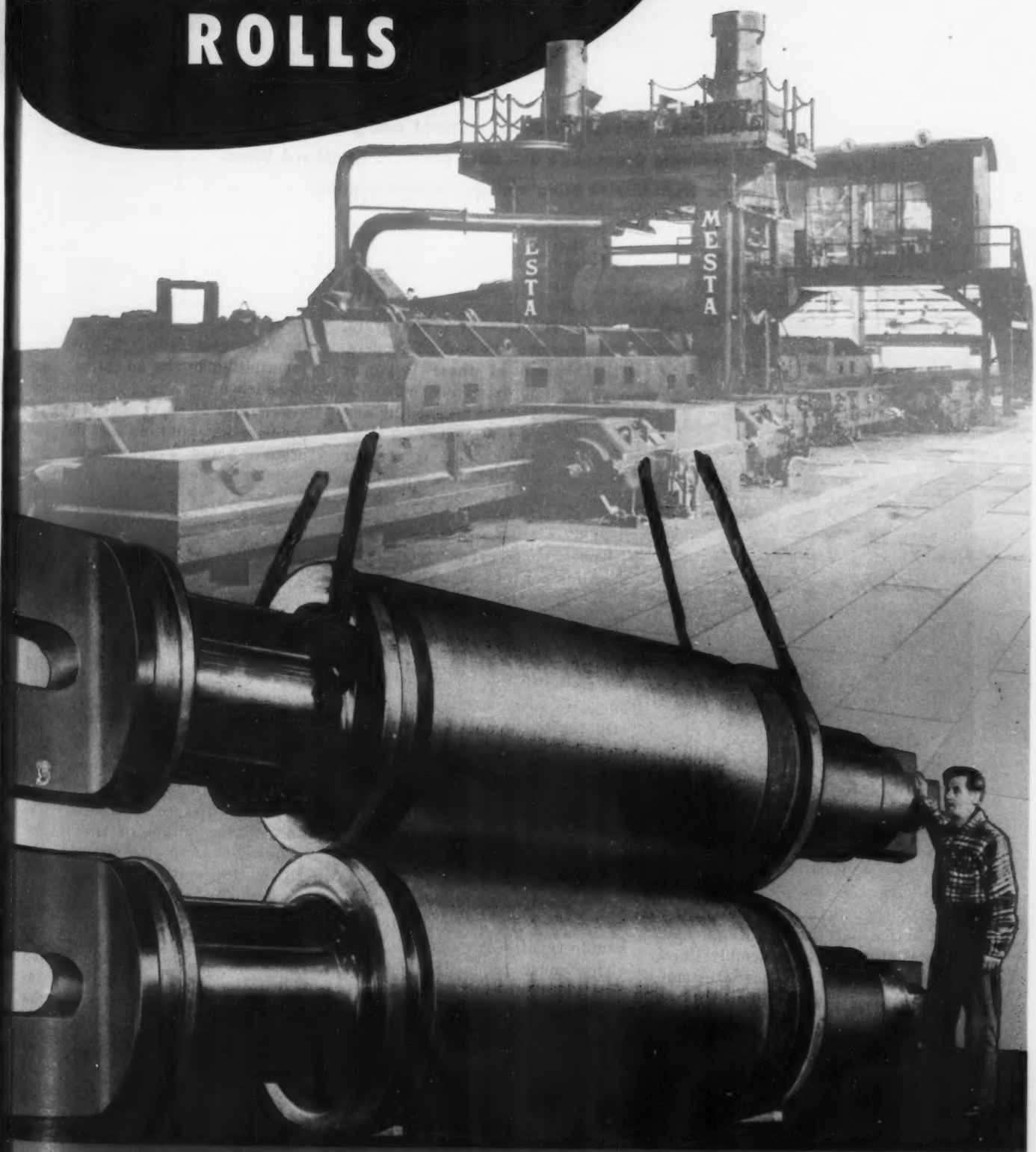
Edwin Paul Weese, vice president in charge of operations for the Carbon Limestone Co., Lowellville, Ohio, died on Feb. 12 at the age of 50 years.

Charles E. Scheuring, 62, president and co-founder of the Emerson-Scheuring Tank & Mfg. Co., Inc., Indianapolis, died on Feb. 15.

Dr. Horace W. Gillett, 66, former director of Battelle Institute, Columbus, Ohio, died on Mar. 3. He was one of the world's foremost metal scientists and a one-time associate of Thomas Edison.

Arthur E. Gibbs died on Mar. 2, he was 74 years old. Mr. Gibbs had been associated with the Pennsylvania Salt Mfg. Co. and was internationally known as an electrochemist and inventor.

MESTA
BLOOMING MILL ROLLS



DESIGNERS AND BUILDERS OF COMPLETE STEEL PLANTS

MESTA MACHINE COMPANY · PITTSBURGH, PA., U.S.A.

On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

Electrical engineer describes control and power features of the new Oldsmobile assembly plant . . . Packard Ultramatic transmission using a unique assembly plan.

by Walter H. Potter

Detroit—A phase of a modern automobile assembly plant not often discussed is the vast array of electrical switches and precisely designed and controlled motors that keep the cars and necessary materials moving. A setup in a modern auto plant was described recently by Walter H. Behnke, application engineer of Reliance Electric & Engineering Co., Cleveland. Mr. Behnke had an active part in the design and installation of the assembly lines and controls at the new Oldsmobile plant in Lansing, Mich.

System Handles 80 Cars Hourly

It should be explained perhaps that at the Oldsmobile plant the conveyer system must be capable of handling up to 80 cars per hr. At present, the Olds assembly line consists of a total of 42 conveyers, 18 line conveyers and 24 feeders. Total length of these conveyer lines is approximately 5,000 ft. The highest speed reached by any of the single line conveyers is 32 fpm. A spacing of 21 ft per car means that a new Oldsmobile is completed every 45 sec.

Precise Timing Necessary

The various drive systems for the Olds conveyer lines require a total of 75 motors and 18 V-S drives. (The trick is, of course, to keep all these motors running in perfect synchronization.

Talking before Lansing engineers recently, Behnke described in detail the complete Olds layout and explained how the several conveyer lines are tied together.

The job of synchronizing movements between the conveyers and feeder lines is, of course, tremendous. Timing must be precise. Variable loads on motors must be handled safely. Some flexibility has to be built into the lines—to handle repairs, for example. Provision must be made to supply power in case of a breakdown. Above all, continuous and perfectly synchronized operation must be provided under any operating condition that may develop.

In his Lansing talk, Mr. Behnke showed how both AC and DC motors are used, depending on the type of load and service. An interesting feature of the Olds installation is the so-called "synchrolock units" used to hold conveyer lines at exact speeds during acceleration, running and deceleration. These synchrolocks, Mr. Behnke explained, are slip ring motors designed to give identical electrical performances so that when interconnected they become essentially an electrical line shaft. Any motion imparted through one of them will be simultaneously and identically produced by the other—and with less angular deflection than would be present in a long steel line shaft.

Regulators Control Voltage

Among other interesting features of the new Oldmobile assembly plant are (1) the electronic regulators used to control the voltage output of the 40 V-S generators supplying power to the DC motors driving the main conveyers, (2) the solenoids used to disengage and engage the clutches for conveyer drives so that the spare units will be disengaged when the drive is running. Another interesting feature is the control so designed that any person stopping the conveyer will immediately flash a light on a control panel as well as at the station where the stop has occurred. This light cannot be extinguished even

Wheelabrator SAVES $10,104 per year

AIRLESS BLAST CLEANING

at the OHIO CULTIVATOR DIV. of the NATIONAL FARM MACHINE COOPERATIVE, Inc. Bellevue, Ohio

COST COMPARISON CHART

	FORMER METHOD	WHEELABRATOR METHOD
MACHINE	5 Tumbling Mills	36" x 42" Wheelabrator Tumblast
PRODUCTION	10 tons in 9 hours	Per Ton $2.09
LABOR REQUIREMENTS	3 men @ 9 hrs. each 27 man hours	2 men @ 10 hrs. each 20 man hours
CLEANING COST	Per Ton $4.195	20 tons in 10 hours

One Wheelabrator at the Ohio Cultivator Division has cut the per ton cleaning cost in half. Alone, it cleans 20 tons of castings per day as compared with 10 tons previously handled by 5 tumbling mills.

The Wheelabrator Tumblast quickly removes every semblance of sand and scale with the result that machining and grinding costs have been lowered and tool life increased.

There are two big reasons for cost-reduction with the Tumblast: (1) The fast, efficient Airless Wheelabrator blast unit; (2) The exclusive endless conveyor method of tumbling provides complete blast coverage.

Write today for Catalog 74-A "The Airless Wheelabrator... What it is and What it will do."

SAVINGS

Per Ton	$2.10	Per Month	$842.00
Per Day	$42.10	Per Year	$10,104.00

American
WHEELABRATOR & EQUIPMENT CORP.
510 S. Byrkit Street Mishawaka 3, Indiana

though the conveyer is returned to operation unless it is reset by means of a special key.

Packard Employs Unique Transmission Assembly Plan

There are many interesting and unusual features involved in the machining and assembly of the new Packard Ultramatic transmission. Tooling is modern, including multi-stations and transfer machines equipped with unusual feeds and tools operating at high speeds. Among the many special machines are a Barnesdril four-station drilling machine, a Cincinnati Hydro-Mill, Foot-Burts, Bullards, Greenlees and some special machines supplied by Hoern & Dilts of Saginaw. A New Britain model 27, six-spindle boring machine equipped with carbide boring bars is used to precision bore the planetary cage.

Transmission Built by One Man

Probably the most unique and interesting feature of the Packard operation, however, is the fact that one worker—rather than a whole series of workers spread out along an assembly line—completely assembles the entire transmission. This is a unique situation in the automobile industry today.

To be specific, each Packard Ultramatic transmission is built by a single operator who rides around a merry-go-round assembly line on a platform. The platform is equipped with a jack and a compartmented box filled with nuts, bolts, washers, springs, cotter pins and other small parts. Sub-assembly lines feed in around the periphery of the assembly line and the operator picks up the parts as his assembly platform moves slowly around the track.

Greater Flexibility Achieved

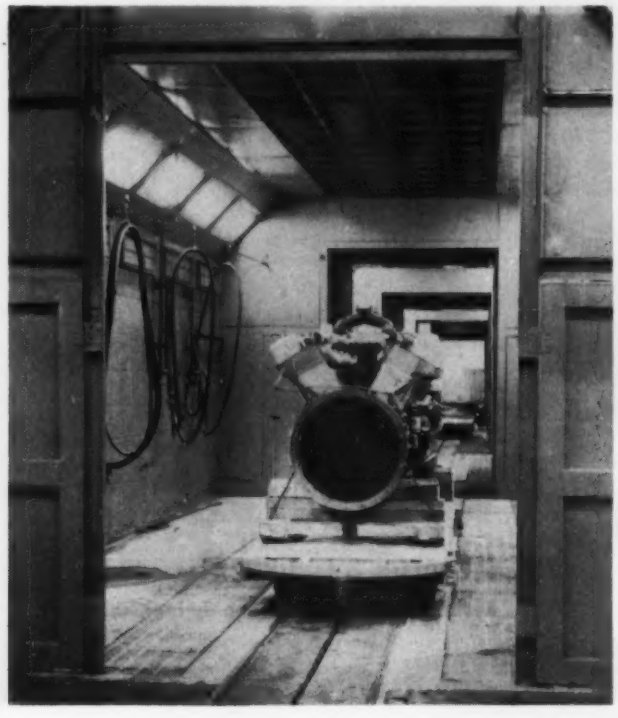
The use of a jack for assembling an automobile part is not new. Rather, this was one of the earliest methods employed in the industry. The same method of assembly was employed during World War II to build aircraft engines. However, it has been very rare in the auto industry in recent years where a worker could say, "This is my work. I assembled this transmission or engine entirely by myself."

Potential advantages of the Packard setup are these: (1) greater pride of workmanship, (2) comparative freedom from monotony for the worker, (3) greater flexibility in production. For example, assuming the feeder sub-assembly lines are kept filled, any number of assembly stations can be kept running without affecting the efficiency of the others.

Decision Appears Justified

E. G. Patzkowsky, manager of the Packard transmission div., is careful to explain that the Packard assembly plan was adopted primarily because time study showed that the "balancing" of operations on the Packard transmission presented an unusually complex and difficult problem. (In automobile parlance, "balancing" is a term used to describe the ingenious schemes that have to be worked out to equalize the time of each individual operation and allocate the work equitably.) Thus far, the decision by Packard to use this unique assembly plan appears to be more than justified.

In passing, it may be observed that neither the Buick Dynaflow transmission or the new Chevrolet Powerglide is using the Packard assembly plan. Both GM plants are using the assembly line method in which each worker performs one small task as the transmission passes his station on the line.



ENGINE BOOTH: Diesel engine enters washing, painting and drying booth in new diesel engine factory of the Caterpillar Tractor Co. at Peoria, Ill. The factory was designed, erected and equipped for economic manufacture of the company's line of diesels.

Chrysler Strike Outlook Bleak

Last week the Chrysler strike went into its eighth week. If there has been any progress made in negotiations carried on more or less continuously during the past few weeks it is not evident.

At a recent mass meeting, which filled the huge Fairgrounds Coliseum in Detroit, Walter Reuther told the cheering workers that rather than back down, the union is prepared to up its demands week by week until Chrysler knuckles under. Apparently the company was not impressed with the threats expressed by the strikers; it showed no signs of retreating from its position.

An interesting aspect of the present Chrysler strike is that it has a direct connection with General Motors and Ford. This may be another reason why a quick settlement is difficult.

TO THE

Stamping Trade:

You cannot afford to be without the benefit of a

BUDD-McKAY

PROCESSING OPERATION WHEN PRODUCING HIGHLY FINISHED DIE DRAWN PARTS

(1) Represents Hold-back Rolls
(2) Flexing Roll
(3-4) Double pair Pulling Rolls
(5) Backed-up Leveling Roll Unit

MORE MACHINE

McKAY

FOR YOUR MONEY

Incidentally **Have You Reviewed Your Metal Finishing Costs Lately?**

THE McKAY MACHINE COMPANY • YOUNGSTOWN, OHIO

WEST COAST PROGRESS REPORT

Steel warehouse jobbers wary but consensus shows expectancy of fair business and a year at least as good as in 1949.

Digest of Far West Industrial Activity

by J. Reinhardt

San Francisco—Operators of steel warehouses in this area are not exactly jubilant about sales volumes but the consensus among them seems to be that business generally is looking up. A survey of principal steel jobbers brought out reports on business all the way from "only fair" to "we are doing better than last year and expect to wind up this year with total sales at least as good as 1949."

Net Less Than Pre-War

In spite of rumors that local warehouse prices were being shaved here and there, there is no substantiating evidence. On the contrary, jobbers report stabilized prices. As has been true since time immemorial, salesmen are occasionally reporting to sales managers that they didn't get an order because the customer said he could get a better price elsewhere. Experienced sales managers don't put too much credence in these explanations and when the showdown comes it usually develops that this is a customer's method of bargaining.

Current warehouse prices do not completely reflect all increases in mill prices according to several large jobbers who state that their current markups are not bringing in a net equal to that of prewar days. As an example, current warehouse prices on some products not produced on the West Coast do not include all freight charges, with the warehouse absorbing some of the shipping costs. In spite of the steel strike and the recent coal strike, warehouse stocks are generally in good shape with the exception of flat rolled products which remain tight. Sixteen to 30 gage sheets of any kind are kept in stock only for a matter of hours.

Some warehousemen expect the light gage sheet situation to improve in 3 or 4 months although there are others who expect no material relief for at least 6 months. Bethlehem Pacific Coast Steel Corp., through shipments from Bethlehem's Sparrows Point plant, and Columbia Steel Co., from its plant at Pittsburg, Calif., and Torrance, Calif., are practically the only suppliers of sheets to the West Coast market at present. A large percentage of the production of the cold reduction mills of Columbia at Pittsburg is going into tinplate and if there is an adjustment downward in demand by the can makers this would be quickly reflected in increased availability of light gage sheet.

Steel Producers Reminded Of Poor Production of Yesteryear

Seattle — Unpleasant memories of the grim days of 1937 and 1938 when steel producers sweated out each month are being recalled in this area by oldtimers while newcomers to the industry, familiar only with wartime production and the lush postwar years, are confused by present low operating rates in this area.

The much-needed shot in the arm which was to come with the return of more seasonable warm weather hasn't arrived. Bethlehem Pacific Coast Steel Co. is now operating 2 furnaces producing approximately 9000 tons of steel per month and in general reports that business is at the lowest point it has been in the past 10 or 12 years. Most of the employees that have been laid off during the

A Typical Machine Shop Reports:

33% BETTER PRODUCTION

... Longer Tool Life
... Better Finish

WITH J&L FREE-CUTTING "E" STEEL

...THE NEW FREE-CUTTING BESSEMER SCREW STOCK

Hundreds of profit conscious machine shops throughout the metal-working industry have switched to J&L "E" Steel to ensure dollar savings through longer tool life and increased production.

Here's a report from a typical independent shop which produced the parts shown actual size at right:

"J&L 'E' Steel machines very well . . . the finish obtained has been excellent . . . our tool life has been increased . . . we have been able to realize 33% better production. We are interested in changing all our specifications to your new 'E' Steel."

These are reasons why J&L "E" Steel has been so enthusiastically accepted throughout the industry. But there are others—four years of exhaustive field testing in over 100 applications proved J&L "E" Steel's superiority. Now since "E" Steel has been on the market, 80% of the new users report:

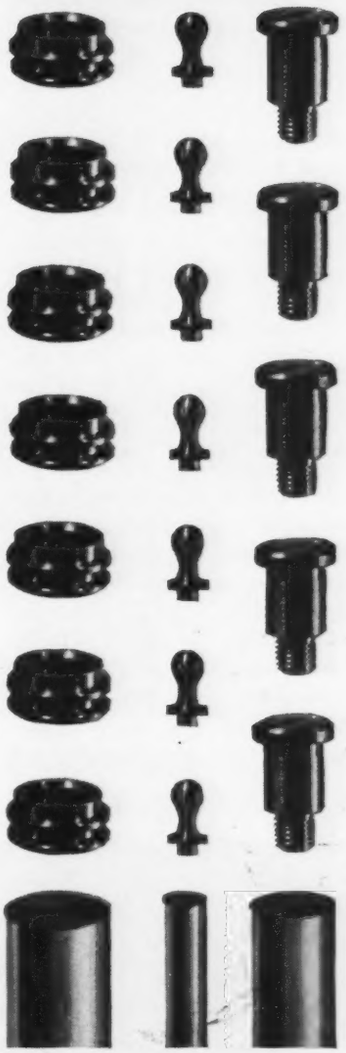
- ★ Better Machine Finish
- ★ Longer Tool Life
- ★ Higher Speeds
- ★ Machinability Ratings up to 170
- ★ Better Response to Forming and Cold Work

J&L "E" Steel is made in three grades: *E-15*, *E-23*, and *E-33*, each within the composition limits of the standard bessemer screw steels and with similar tensile properties.

Investigate the production economies you can gain with J&L "E" Steel. Write today for your free copy of the booklet "Faster Machining... Smoother Finish . . . Longer Tool Life." It will give you additional information on properties, grades and their equivalents, and applications.

"E" Steel (U.S. Pat. No. 2,484,231) is easily identified by the distinctive blue color on the end of every bar.

J&L STEEL



PARTS SHOWN ACTUAL SIZE

JONES & LAUGHLIN STEEL CORP.
403 Jones & Laughlin Building
Pittsburgh 30, Pennsylvania

Please send me your booklet, "Faster Machining . . . Smoother Finish . . . Longer Tool Life," describing J&L "E" Steel.

NAME_____

ADDRESS_____

COMPANY_____

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY *(hi-tensile steels).*

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

winter season are still either holding down temporary jobs elsewhere or drawing unemployment compensation. Bethlehem's management has retained enough skilled employees to insure efficient three furnace operations when needed by transferring open hearth men to other jobs throughout the plant. These transferees are good men readily adaptable to new jobs. As one official said, "You can't afford to keep anyone on the payroll when they aren't producing and when our tonnage is at this low figure."

Northwest Needs Business

Northwest Steel Rolling Mills here also is in need of additional business. Since the local strike against the company last September it has been operating its rolling mill on a 5-day week on only a few occasions. The usual schedule has been a 4-day week and the rolling mill has frequently been shut down. During December, for example, the rolling mill operated only 1 week; January saw it in operation 3 weeks and February production was confined to approximately 3 weeks. March got away to a slow start with operations on a 4-day basis.

Some of the more optimistic here believe that business will begin picking up in another month or even sooner when weather in Alaska improves enough to permit some of the government's construction to get underway. A step-up in local construction is also expected now that snow and ice apparently are past for this year.

Utah Nonferrous Metal Mine Wage Bargaining Breaks Down

Salt Lake City—Utah's idle nonferrous metal mines will remain idle until something happens to substantially improve their economic status.

Union-management negotiations on proposed new working agreements have collapsed and both sides have taken a glum view as to the prospects of reaching a mutually satisfactory agreement. Operators have offered a guarantee of $8.35 per day with a bonus arrangement tied to increased productivity and improvement in the quality of ores. The union is standing pat for a guarantee of $10.85 per day, the prevailing rate before the mines closed last July 1. Union leaders argue that even if they agreed to the $8.35 guarantee the mines would be unable to recruit a working force in view of the disparity that would exist in relation to prevailing pay rates in other industries.

Operators feel that the basic cause of their trouble is "the administration policy of encouraging imports." This, coupled with devaluation of the British pound, has given Australian and New Zealand producers a strong competitive advantage.

If the mines are completely closed down for a considerable period, as it now appears they will be, a new crop of ghost towns may be the result.

Renewed Coal Flow Brings Plants Back to Good Production

San Francisco—A quick return to almost normal operations was reported by both Geneva Steel Co. in Utah and the Kaiser Steel Corp. at Fontana, Calif., as coal miners returned to the pits. Geneva had two blast furnaces in operation at the Geneva plant and 1 at Ironton by Thursday. Openhearths were pouring steel by Friday and rolling mills were in production last Sunday. One blast furnace at Fontana was at full operation again last week although the second was still out because of repairs which were expected to be completed in about 2 weeks. By the end of last week ingot production and rolling schedules were back to normal near-capacity levels.

Kaiser's Plants Rush Production

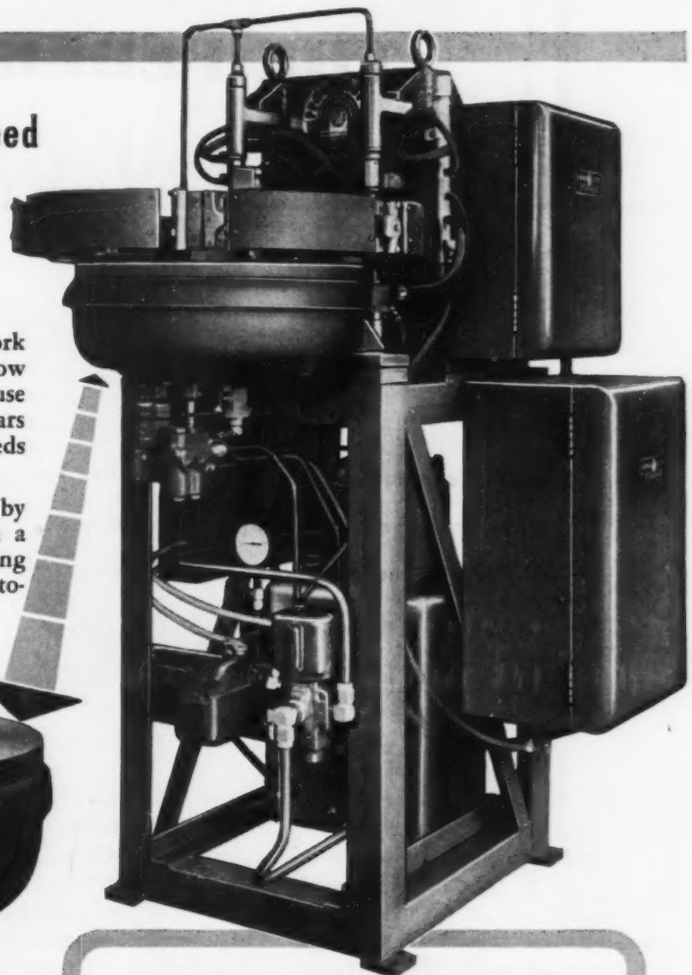
Spokane—Aluminum production at both Mead and Trentwood plants of Kaiser Aluminum & Chemical Corp. is being stepped up as rapidly as possible to fill rush orders for corrugated aluminum sheets for manufacturers of grain storage bins.

The governmental program for the construction of bins capable of storing approximately 90 million bushels of grain reportedly will require more than 1000 tons of aluminum.

STEEL COLUMN: First steel column being raised by an erection crew for Bethlehem Pacific's new structural steel fabricating plant at Seattle. Approximately 1200 tons of structural steel will be used in the plant.

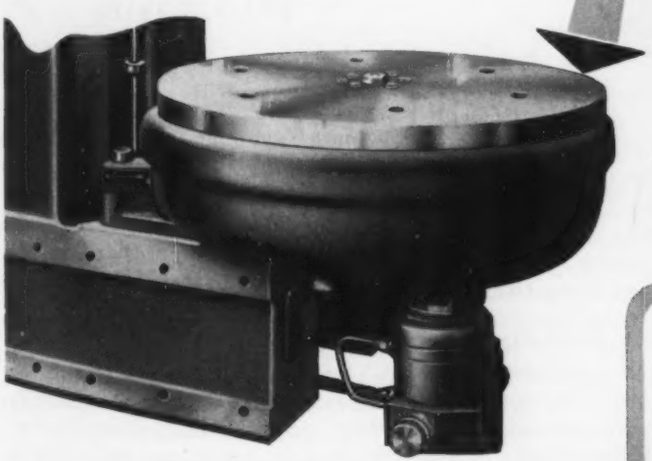
New Answer to Faster Production

Index Table Now Offers Accurate Feed For Many Types of Equipment and Many Different Operations



You get fast, automatic accuracy when you feed work to machines on Denison Indexing Tables. And now this advanced type of automatic feed is offered for use on *all types of production equipment*—backed by years of successful and often sensational results on hundreds of Denison Presses.

A good example is the welding unit at right, built by Progressive Welder Co., of Detroit. Equipped with a Denison Indexing Table, it features automatic feeding of parts to the welding guns, automatic squeeze, auto-



matic welding, automatic hold, and automatic release—in positive sequence and at controlled speeds. Each operation can be regulated individually.

The compactness of these streamlined, fully enclosed tables makes them easy to combine with other equipment. Tooling or fixtures can be evenly spaced about the dial for either 6 or 12-station indexing.

Speed of the table is regulative, and its movement is positively interlocked with operation of the equipment on which it is used. Space inside the table housing permits use of cam tracks, for automatic ejection. Possible variations in applications are almost unlimited. Please write for full details in terms of your own needs.

DENISON HydrOILics

HydrOILic Pumping Unit Powers Indexing Table

Power for the Denison Index Table is supplied by this complete and highly compact pumping unit, which can be either a part of the complete machine assembly, or can be installed separately at any point, with connective piping. Available in several models and sizes.

The DENISON Engineering Co., 1158 Dublin Rd., Columbus 16, Ohio

We would like more information on Denison Indexing Tables. We are especially interested in their possible application to:

Type of operation_____

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Name_____

Firm_____

Street_____

City_____ Zone_____ State_____

THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

Official Washington attempting to devise remedies to prevent drastic effects of future coal strikes . . . Truman wide open for inept handling of coal strike.

by Eugene J. Hardy

Washington — Again John L. Lewis has lowered his economic gun from the collective heads of the American people. As usual, after each of these economic blood-lettings, official Washington is busy cooking up all sorts of remedies to present similar rampages in the not-too-distant future. This official concern has generally diminished as the coal production index climbed. This year, however, it may continue for many months, because both parties are going to have to answer a lot of questions in the coming Congressional election campaigns. People who have been cold and out of work in recent weeks might be looking to their elected representatives for some relief.

Commission To Study Industry

The Democratic remedy is President Truman's Commission on the Coal Industry. Since this Commission, to be composed of members of Congress, public officials, and representatives of the public, would not have to report for a year, it might help to keep the Democrats off the hook until after the fall elections. It is supposed to study the coal industry from the standpoint of national economic, social and security objectives. It will have to look into costs, wages, employment, size, reserves and competition.

Doubt Truman's Sincerity

What can such a commission accomplish? Not very much, according to most Capital opinion, unless the Administration is ready to nationalize the coal industry. This objective is not too-far-fetched for some of the more liberal members of Congress, who had introduced legislation calling for similar study Commissions before Mr. Truman publicly made his request in the seizure message.

There is considerable doubt concerning Mr. Truman's sincerity in asking for such a Commission. Certainly, the President is wide open for his inept handling of the coal strike and such a move might help to indicate that he does feel that the public is entitled to some consideration. It is also rather surprising that he asked Congress to authorize this Commission, for it is generally known that almost a month ago he was considering establishing such a Commission on his own. Could be that with Congressional approval the White House could point out that Congress agrees with the President about the inadequacy of the Taft-Hartley act in regard to nation-wide strikes.

Such a Commission might conceivably come up with recommendations for legislation similar to the Guffey Coal Act, the first step on the road to nationalization. The present Supreme Court might not agree with the 1936 Court which found that this attempt at cartelization was unconstitutional.

Protection May Be Considered

Facetiously, some labor experts suggest putting the coal industry under the Agriculture Dept., and qualifying it for price supports. Even though this suggestion is put forth facetiously at the present time, it might well be that some such protection may be seriously considered in view of the declining market and almost limitless supply.

Recommendations on labor legislation that would amount to anything are too much to hope for

pretty trim, trims costs 10¢ a wheel

it's done with mirror-like **CMP** bright annealed stainless strip THINSTEEL

Savings of approximately 10¢ on each steering wheel mean thousands of dollars to this important manufacturer. And CMP bright annealed stainless makes them possible. Using a true stainless type 302 in .010" thickness, both left and right trim pieces are fabricated from identical blanks—surface brightness and luster being uniform on either side of the strip. Buffing or polishing of the formed parts has been eliminated. The highly lustrous finish on the annealed chrome-nickel strip in the *as supplied* condition is not destroyed during the fabricating operations.

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EXTRA-LONG COILS . . . . . less downtime
EXTREMELY CLOSE TOLERANCES . more parts per ton
WIDE RANGE OF PHYSICALS AND ANALYSES . . . . . tailored to your needs
GAUGES AS THIN AS .001" strength with lightness

from a Truman-inspired Commission. Mr. Truman has already done too much to undermine the Taft-Hartley Act. The President has claimed that the T-H Act does not stop strikes and can be expected to use the recent coal stoppage to prove his point. But the country doesn't know whether the T-H Act would be effective in such cases, for it has never been given a fair chance. Mr. Truman waited almost a year before invoking its provisions, and by that time the country was suffering from a severe shortage of coal. When the UMW refused to obey the court's injunction, the Justice Dept.'s contempt charges were prosecuted with something less than vim and vigor. A mild state of vim and vigor.

Prevented Act Modification

During the long period that John L. Lewis toyed with the nation's economic welfare, Mr. Truman continued to denounce the T-H Act. In fact, in January of this year, when the coal situation was fast approaching the critical stage, he again asked Congress to repeal the Act. Last year, he prevented any modification of the act by insisting on complete repeal. A Senate-approved version of an amended act would have given him the seizure power which he so belatedly requested. Is it any wonder that John L. Lewis and other labor leaders might well feel that they can defy this law and get away with it?

Injunction Request Ignored

Largely ignored in all this political hot air about the inefficacy of the Taft-Hartley Act is the injunction request by NLRB General Counsel Robert Denham in which the Court directed John L. Lewis to bargain in good faith and to drop certain illegal contract demands. This injunction was held to be largely responsible for the abolition of the "willing and able" clause in the existing coal contract.

But despite this injunction, which directed the union to bargain in good faith, Mr. Truman, in his seizure message, struck at the bad faith of both parties. The President emphasizes the fact that what is necessary is a return to real collective bargaining, but it is generally recognized that this is impossible until the country gets rid of one-sided Administrations, one-sided fact-finding bodies, one-sided commissions, etc.

Barring a recommendation that would put the Government in the coal business, not too much should be hoped for from the efforts of this Commission. It might come up with some impressive studies of markets, competitive fuels, etc., but it won't make John L. Lewis or any other labor leader behave just because it might be in the public interest for him to do so.

Instead, real help might come from an Administration that really wants to enforce the laws and from current legislative efforts to abolish industry-wide bargaining and subject unions to the anti-trust laws.

New Law Amends Basic FTC Act

Drastic increases in penalties for violation of Federal Trade Commission orders have been enacted into law with Presidential approval of the bill repealing Federal taxes on margarine. The new law, with a sneak amendment written by FTC General Counsel W. T. Kelley, authorizes a fine of up to $5,000 for every day on which an FTC cease and desist order is not obeyed. Previously, FTC could ask the courts for a fine of $5,000 for each violation, but not on a continuing basis. The amendment was supposedly designed only to prevent misrepresentation in the sale of margarine, but it goes much further. It amends the basic FTC Act, therefore, the new penalties apply to any violation regardless of the industry or product involved.

Mr. Kelley says that the principal value of the new law would be "in the field of price fixing and continuing conspiracies in restraint of trade." He singled out the cement, electrical equipment, and certain iron and steel products as examples of cases where FTC has orders against continuing price fixing conspiracies and where the new penalties might help to assure compliance.

THE BULL OF THE WOODS — By J. R. Williams

I CAN'T DRAW GOOD, SO I'M SHOWIN' YOU TH' IDEA I GOT WITH THIS SCRAP PILE STUFF!
WAIT, SEBRING-- WE MISSED SOME OF IT!
WAIT, TALK SLOW-- I WANT TO BE SURE I UNDERSTAND IT!
HE'D BETTER STICK TO DRAWIN' IT, NO MATTER HOW BAD IT IS! THEY'LL KILL HIM OFF FOR A JOKE--THEY'LL HAVE HIM HOLDIN' THAT UP ALL DAY!
3-17
J.R.WILLIAMS
THE CONTINUED STORY
T. M. REG. U. S. PAT. OFF.
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1913

1914

1915

CHEVROLET

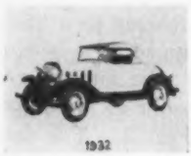
ADOPTS A NEW Torque Transmission

Mass production to exacting tolerances plus precision brazing of stamped parts set a new high in Detroit's ingenuity

By **THOMAS E. LLOYD**
Machinery Editor, The Iron Age

1918

1925


1932

THE announcement of the new transmission in the 1950 Chevrolet brought to light one of the outstanding engineering-production jobs of the postwar period. First, the torque converter had to be adapted to the Chevrolet price range, and second, a method of fabrication had to be developed that would assure quality as well as quantity. The transmission had to give satisfactory performance and economy, be adaptable to mass production, be as inexpensive as practicable, easy to ship and handle in assembly plants, and trouble-free.

The transmission is complete within itself. It is connected to the engine by bolting the cast iron housing to the flywheel housing and the converter housing to the flywheel. No gaskets or seals are needed between these parts, and the transmission and flywheel assembly occupy the same length as the conventional transmission and its clutch housing.

The hydraulic torque converter is made up of three major sections: The driving member or

pump, the driven member or turbine, and the reaction members or stators. These sections are made up of five elements: *Primary Pump, Secondary Pump, Turbine, Primary Stator,* and *Secondary Stator*. These components are formed and assembled at the Chevrolet-Flint Mfg. Div. of General Motors Corp., at Flint, Mich. Machining operations on these assemblies and other components of the transmission are done at Chevrolet-Cleveland Div.

A radical departure from production techniques heretofore used in converter manufacture was developed for the Chevrolet converter. The torque converter section is made up of sheet metal stampings. Achievement of this unique method of production, the first such accomplishment in the automotive industry, is outstanding and the result of Chevrolet's broad experience in the manufacture of stamped parts. The Flint pressed metal organization, with the cooperation of Chevrolet-Detroit engineering, developed the dies, tools and processes to produce parts that must be formed with unprecedented precision.

About 120 major dies and more than 100 assembly process fixtures were designed and constructed. Ten of the dies are progressive, with from 6 to 12 stages, and the balance are of the blank, pierce and form variety. All five converter components are built to unusually close limits, and in some cases the steel is purchased to extra close rolling limits and a premium paid for such stock. For inspection in production and assembly, about 200 special gages were designed and built.

Fig. 1 shows the five converter elements and their individual parts. The pump and turbine, the main elements, are equipped with an extra set of vanes that are called overrun or hydraulic couplings. The secondary pump and the primary and secondary stators, are also equipped with vanes, none of which resembles vanes in the other elements. The vanes are first spotwelded into place and then brazed.

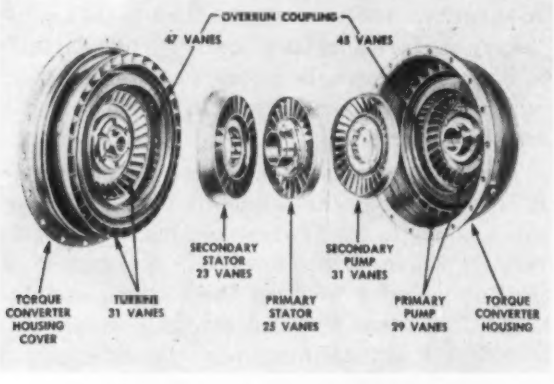


FIG. 1—These five elements make up the converter in the Chevrolet automatic transmission.

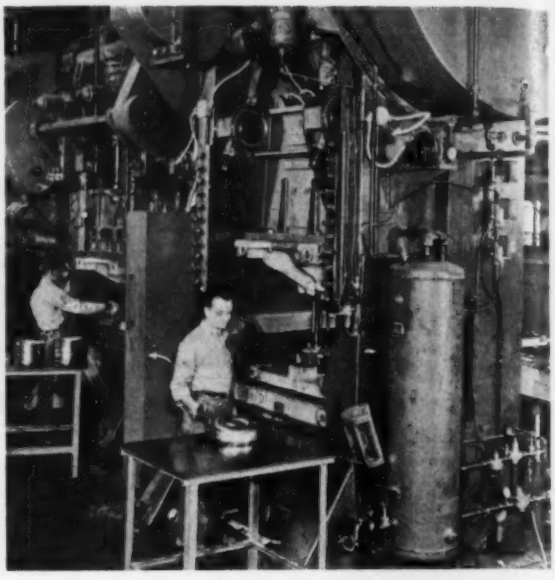


FIG. 2—Pump outer shells are drawn in this 125-ton press. This is the delivery side of the press.

Typical of the Chevrolet-Flint operations and the production to unusually close tolerances is the manufacture of the primary pump. The assembled part, shown in Fig. 1, consists of two main shells, two overrun coupling shells, and two sets of vanes. Stock for the shells is rolled to ±0.001 in., which is closer than commercial tolerances.

Cut sheet stock is fed into a 48-in., 125-ton double-action press for blanking and shallow drawing the outer shell. The shallow drawn parts, shown coming out of the press in Fig. 2, are then inspected in a flush pin depth gage, washed and annealed in a reducing atmosphere furnace. After oiling they are redrawn and the center flange formed in a Bliss press, the OD finish-trimmed, and six 11/16-in. diam holes pierced in a No. 10-1 O.B.I. press. Inspection on this finish-formed part consists of a check of the inside and outside form, the location of six holes, a check of the OD and a snap gage check of the 2.870 in. diam.

The inner shell is formed in a 48-in., 125-ton double-action press. The cut sheet stock is blanked and drawn, and the shallow drawn part is inspected. After washing, annealing and oiling, the shell is redrawn to final depth. The part then has a center hole pierced in a No. 28 O.B.I. press, trimmed and inspected for inside and outside form.

The primary pump vane is formed in a 48-in., 100-ton high speed press equipped with a stock cradle and feed. A progressive die arrangement is used in forming this part, using 10 die stages. This operation is shown in Fig. 3. The inset shows the individual stamping operations. After tumble burring, the part is washed, annealed, oiled and restruck. In the restrike operation, the parts are placed on a rotary die which indexes to

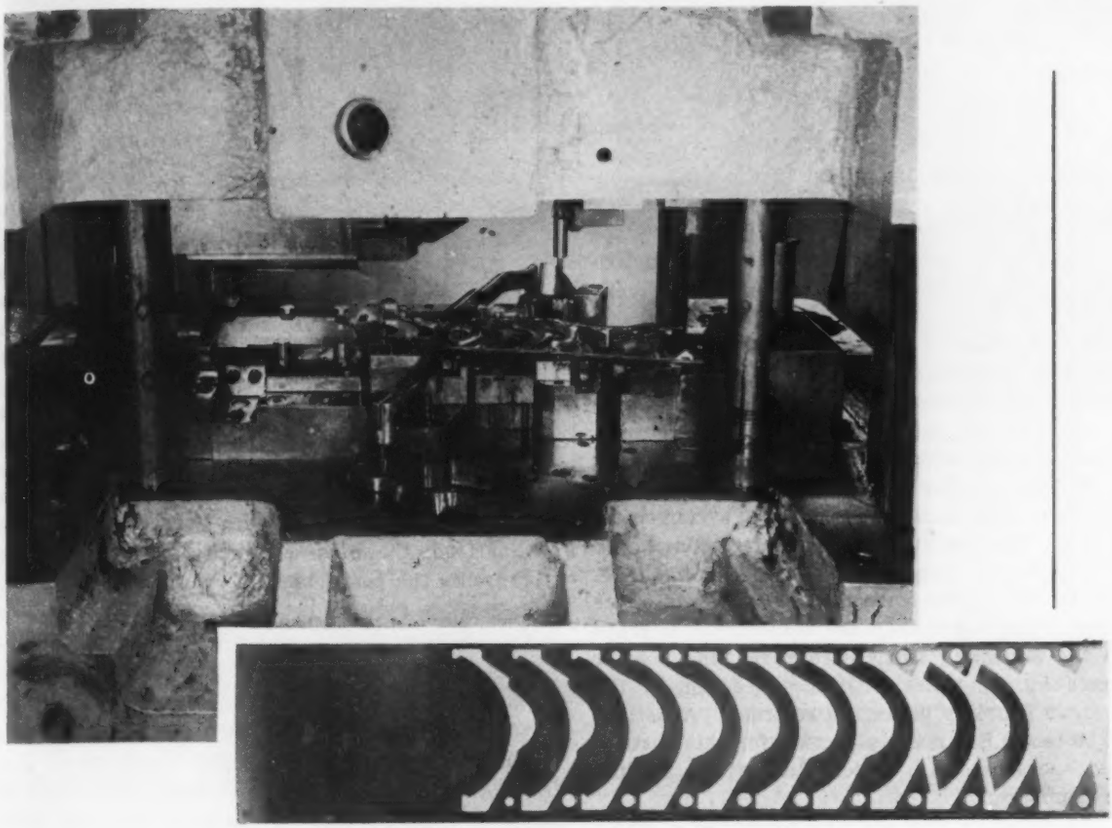


FIG. 3—Converter part vanes are formed in progressive die setups. This is the production arrangement for the pump vanes, and the steps are shown in the inset.

the stations performing the restrike operation on both the face and flanged sides, and is automatically removed from the die by a mechanical ejector.

After restrike, the primary pump vane is passed through a Vapor Blast or Liquid Honing machine, where the edges are treated to increase the capillary action required for copper brazing of such a composite structure.

In a like manner the hydraulic coupling shells, inner and outer, are produced. This outline of production merely outlines sequence; details are shown in the various operation classification headings.

LARGE STAMPINGS

The shells, or containers into which vanes are mounted, are formed by the blank, pierce and draw method, as shown in Fig. 2. There are two shells each for the pump and the turbine as well as for the other three main elements. In addition, there are two other pairs of shells for the overrun or hydraulic couplings.

The 0.0239-in. thick stock for these shells is specially rolled to closer than commercial thickness tolerances. The tolerances allowed on stock thickness for the shells is 0.001 in. Press equipment used is conventional. Mechanical presses in capacities up to about 125 tons are used for the original forming. The shell stampings are then annealed to relieve any drawing strains, after which they are redrawn to set the part to finish dimensions.

The pump housing, which is drawn from 0.1793-in. thick stock specially rolled to ±0.005 in., is one of the critical dimension parts in the assembly. It is first drawn in a 600-ton double-action press and restruck in a 200-ton knuckle joint press. After a tapping ring in two sections is welded to the flange the part is again restruck in a 2000-ton knuckle joint press, as shown in Fig. 4. The cover for this housing, made from 0.2391-in. thick stock, is similarly formed.

The housing, shown in Fig. 4, is a deep drawn section with an inside limit of shape held to 0.010 in. total indicator reading. As can be seen from the drawing in Fig. 5, the part is held to a permissible out of round of 0.015 in. and the top flange must be parallel with the hub flange within 0.010 total indicator reading. The hub flange must be within 0.003 in. concave to 0.003 in. convex at the indicated point. Rigid tolerances are likewise held on the contour radius in the base of the shell, as shown in the drawing. On the housing cover similarly rigid tolerances are held.

SMALL STAMPINGS

The small stampings used in the torque converter assembly consist of six different vanes. These parts are formed in progressive die setups in high speed presses. The secondary pump, primary stator and secondary stator vanes, while similar in design, are different in detail. Likewise, the primary pump, and turbine vanes are the same general contour but differ slightly in shape. The vanes used in the overrun couplings of the primary pump and turbine are identical.

In the manufacture of the pump vanes, typical of all vane forming operations, a high-speed, 100-ton press with stock cradle and feed arrangement is used. The forming operations are accomplished in a 10-station progressive die as shown in Fig. 3. The vanes, as they leave the press, drop into tote boxes from where they are transferred to trays on the annealing furnace conveyer line. After annealing, all vanes with the exception of the overrun coupling vanes are restruck. A battery of 50-ton O.B.I. presses is used for this restriking operation with special dial feed loading mechanisms.

Fig. 6 shows the restrike press for a stator vane. Restriking other vanes is similar to this operation. Each table has a plastic fixture shaped to the contour of the underside of the vane. Loaded by hand, these fixtures rotate to a position before the die in the press. A pick-up arm, operated either by vacuum or electromagnet, lifts the vane off the fixture and carries it into the die. The arm is similar in general operation to the arm of a phonograph and is geared to the dial feed cycle in such a manner that it functions only when a new fixture station indexes into position.

As the loading arm moves away from the die in the press, the press is actuated and restrikes the vane. As the press ram returns upward a blast of air blows the vane out of the die into a chute that delivers it to the rear of the press. At the bottom of the chute, a wire hinged gate is coupled to an electro-limit switch, as shown in Fig. 7. As the vane hits this gage it swings the gate up breaking the electric contact. Unless this contact is broken with every index of the dial feed, the press automatically stops. This prevents the positioning of two vanes in the die.

The parts are loaded in tote boxes placed under the chute of the restrike press. Pump and turbine vanes are next transferred to a Vapor Blast machine. The two stator vanes, secondary pump vanes and coupling vanes are not vapor blasted, but are transferred directly to subassembly.

Loaded in rubber fixtures shaped to conform to the underside of the turbine and pump vanes and with a rubber cap shaped to conform to the top contour, the pump and turbine vanes proceed into the Vapor Blast machine. In this machine the edges of the vanes that are to be brazed to the inner and outer shell of the pump are subjected to a force spray containing an abrasive, which gives the vane edges an etched appearance. This improves the flow of copper during brazing.

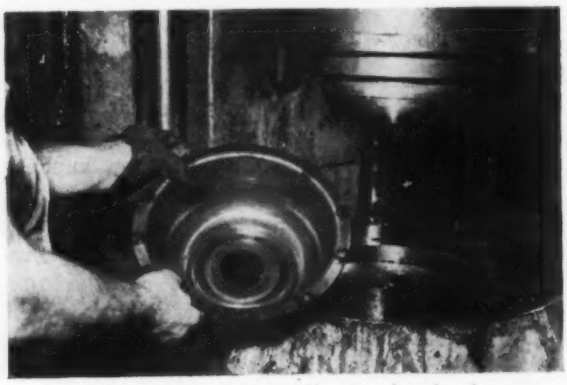


FIG. 4—After a two-section tapping ring is welded to the converter housing, it is restruck to bring it to very exacting dimensions.

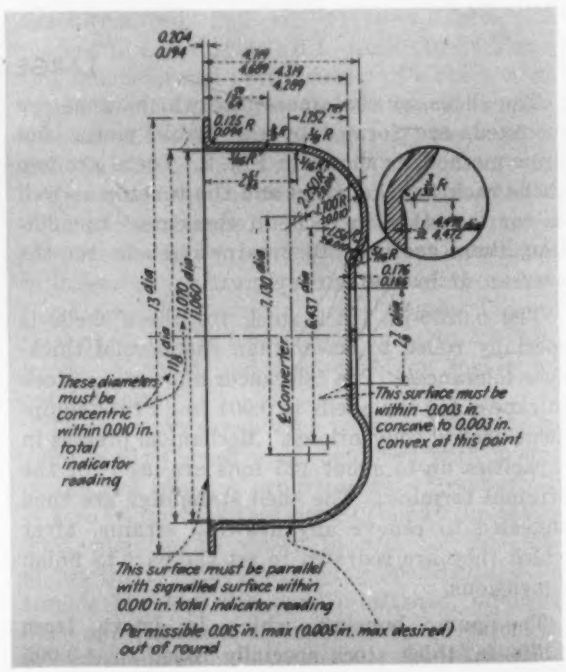

These diameters must be concentric within 0.010 in. total indicator reading
This surface must be within—0.003 in. concave to 0.003 in. convex at this point
This surface must be parallel with signalled surface within 0.010 in. total indicator reading
Permissible 0.015 in. max (0.005 in. max desired) out of round

FIG. 5—Tolerances of the housing are extremely close for a press drawing operation. Details of the part are shown here.

FIG. 6—In restriking the main vanes, this novel indexing table and press loading arrangement is used. The part is moved from the table station to the die by pneumatic or electromagnetic pick-up arm.

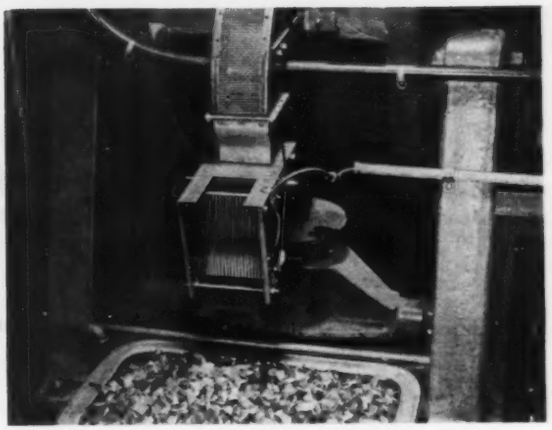


FIG. 7—The gate, behind the vane restrike press, has an electro-limit switch that must be broken with each press stroke by the restruck vane dropping into the tote box. Unless the connection is broken, the press will not make another stroke.

FIG. 8—All shell and vane parts except the overrun coupling vanes are annealed after forming. This 110-ft furnace has three heat zones and operates at 2050°F.

ANNEALING

For bright annealing all shells and vanes of the pump, turbine, overrun couplings, primary and secondary stators and secondary pump, a specially designed roller hearth, Endothermic furnace is used. It is 110 ft long with a heating chamber 26 ft long and a cooling chamber 78 ft long. The unit uses a hydrogen atmosphere, and heat is supplied from Globar heating elements located above the work and below the furnace rolls. The furnace is rated about 630 kw installed capacity, divided into three zones. The bearings of the furnace rollers in the heat zone are water cooled.

Operating temperature is 2050°F, and the atmosphere can be varied over a considerable range from 18 to 40 pct hydrogen and from dry to high dewpoint values. By selector switches, parts may be held in the front, burn-off chamber, or rushed into high heat, as desired. The cycle is completely automatic including tray return.

The Globar heating elements will heat up to 2700°F, but were designed to operate constantly at 2100°F under all conceivable operating conditions including a high reducing atmosphere. The elements can be replaced without stopping the furnace.

Safety precautions are unusual. If the circuit breaker kicks out, the rolls overheat or fail to turn, or other failure occurs, a horn warns the operator. A special device warns of failure of the main drive. The furnace cannot be restarted until the correct atmosphere is established. Nitrogen is used to purge the system. There is also a protection device against the failure of the nitrogen purge. In case of power failure, nitrogen enters immediately. An auxiliary gas engine drives the belt in event of power failure.

The annealing cycle can be varied but is currently set at 1 hr and 20 min. Payload through the furnace is rated at 2280 lb per hr, plus 1800 lb in fixtures and trays. A tray of parts, either shells or vanes, enters the furnace automatically every 3 min, as shown in Fig. 8. On shell parts, the units are loaded in Inconel mat baskets. Vanes are stacked in trays. The furnace is so designed that the heat input can be reduced to accommodate a small load. All rolls and heating elements are interchangeable, and rolls have guide flanges built in to keep trays straight in moving through the furnaces. Rolls are 38 Ni-18 Cr steel.

Editor's Note: The second and final part of the discussion of the converter assembly will be covered in THE IRON AGE, *Mar. 23, issue. It will deal with assembling fixtures, welding, brazing, inspection and material handling, tracing the manufacture of converter parts and the fabrication of the unit.*

METAL FINISHING

Economically uncertain, the year was technically productive and progressive. Prices in some raw materials came down, but the cost of labor continued to rise steadily. Little relief is seen for the coming year but technological progress offers possibilities of overcoming continued high costs and increasing competition.

METAL finishing had an interesting year. It was productive and showed good progress, but the path was anything but smooth.

From an economic aspect, metal finishing suffered from the recession experienced by consumer metal products generally. Retail prices for finished products were forced down by the reduction in public purchasing. Prices for jobbing and contract work were forced down by manufacturers' need to sell at lower prices.

Some raw materials came down but many remained in the upper levels. However, the largest single factor in cost of manufactured metal products—labor—continued to rise. As a result, producers of hard goods for public consumption were squeezed. Only the best equipped and most carefully operated plants were able to emerge with a profit. So-called marginal producers were in a difficult position.

Judging from present indications, the coming year will offer no relief. Prices will remain highly competitive. Labor costs will not come down. Even the leading producers know that in order to maintain their position, they must continue to bring down their manufacturing costs by keeping their facilities up to the last word in productive efficiency. The situation of the marginal producer appears so exposed as to be dangerous.

Technically the industry did well. There were no revolutionary inventions, no world-shaking innovations. But there was sound progress along a number of established lines and in addition, seeds were planted in new territory which promises to be fertile.

IMPORTANT DEVELOPMENTS

One clearly discernible tendency today is the drift away from conventional hand grinding, polishing and buffing. In some instances, however, this trend has taken the path of reducing or eliminating the heavy grinding on steel, depositing a soft, dull, level nickel, and buffing the nickel to a high finish and then depositing chromium. This cycle eliminates the intermediate copper plate and moves the buffing operation over to the soft nickel, which has reduced total costs substantially, in the manufacture of automobile bumpers.

Tumbling, chemical and electropolishing, bright plating, periodic-reverse plating and leveling solutions all combine to reduce and in some cases even to eliminate the mechanical surfacing operations. Also, the wider use of semi- and fully automatic polishing and buffing machinery is gradually reducing the need for the skilled polisher. More attention is being paid to water-dispersible buffing compounds and to sprayed compositions.

One of the recent developments in nickel plating is the process whereby the final nickel surface is smoother than the base upon which it is applied. This action is termed leveling, or smoothing, and is attractive to the plater because it saves labor in polishing or buffing, either before or after plating, or both.

Leveling action is a function of the bath composition and operating conditions. The Watts bath, for example, has no leveling action. Some organic addition agents promote leveling action but at the same time introduce other factors.

One such solution, called Perflow, made by Harshaw Chemical Co. is said to produce a deposit of a modified crystal structure with a uniform semi-bright luster, easy buffability, and most unusual, the property of filling in surface irregularities. These characteristics are said to have effected savings of 60 to 70 pct in polishing and buffing material costs, and 40 to 50 pct of direct labor costs for polishing and buffing, both before and after plating.

Further savings are also claimed by the elimination of copper plating and copper buffing prior to nickel plating. This solution is basical-

DEVELOPMENTS OF 1949

By ADOLPH BREGMAN
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ly a typical Watts nickel bath, to which have been added an addition agent, a non-pitter and, in some instances, a buffer. The important factor in operating this bath is reported to be the control of the addition agent.

Another proprietary solution for the same purpose is the modified 9-H cobalt-nickel bath of Hanson-Van Winkle-Munning Co., which, it is stated, provides some leveling action, but with the additional advantage of retaining the softness and easy buffability of the deposit over a long life of the bath.

Periodic reverse current plating is another promising process, offering the advantages of increased production, brighter deposits, greater corrosion resistance and better plate distribution. These benefits are obtained by interrupting the normal direct plating current and immediately reversing this current to remove or deplate a small amount of the metal just plated. The plating portion of the cycle is longer than the deplating period, a 15:3 sec (cathodic to anodic) or a 15:5 sec cycle being most common.

This is accomplished, generally, by inserting a reversing unit between the current source and the negative bus bar. The process has, to date, made most progress commercially in silver, but it is applicable to other metals as well. It has been found useful for depositing copper on die castings, plating heavy, smooth deposits rapidly and eliminating a substantial part of the polishing and buffing labor formerly required. The new PR cyanide copper plating bath developed by Jernstedt offers distinct advantages in this regard.

CHEMICAL POLISHING

Chemical polishing is a new process by which metals can be given a bright, reflective surface without mechanical or electrical operations. It was developed by Battelle Memorial Institute. The product is dipped into a chemical solution, and when withdrawn a few minutes later, it has a high luster. The surface obtained may serve as the final finish or as a base for subsequent plating. In practice, it is stated, chemical polishing has eliminated five buffing operations in finishing luggage locks and hasps with savings of about $65 per 1000.

Metals that can be chemically polished successfully include brass, copper, nickel-silver, Monel, nickel, and aluminum. The action in each case is a true polishing action on the base metal, not a deposited coating. Depending upon the size and shape, the parts may be wired or treated in baskets. Some articles may possibly be polished in barrels or on a conveyer belt, and spraying of the solution is another possibility.

A process has been patented by M. C. Bloom for producing electrodeposits of antimony greater than 0.002 in. in thickness which may be scratched with a knife blade or struck with a hammer, or distorted by being bent through angles greater than 90° without peeling or flaking. Non-porous deposits may be obtained at thicknesses of 0.0015 in. which exhibit a corrosion resistance analogous to that of the pure antimony metal.

Some deposits of this character, on mild steel 1/32 in. thick have been subjected to bending through 90° over a ¼-in. mandrel prior to salt spray without any effect upon the salt spray resistance of the compression side of the bend. Samples subjected to indoor exposure for more than 3 years showed no evidence of tarnish. Outdoor exposure tests of sheets plated to 0.0015 in. with copper, nickel and chromium on one hand, and antimony on the other, have revealed that the tarnish resistance of the antimony coatings is not equal to that of the chromium coatings.

However, for the maintenance of the original luster of such antimony coatings, occasional removal of tarnish by light rubbing with a metal polish such as is normally used for brass, is sufficient. The combination of

the corrosion resistance of antimony coatings and the tarnish resistance of chromium coatings has been obtained by the superdeposition of flash coatings of chromium upon the antimony deposits.

One property of these deposits which makes them highly suitable for electrical and other metal products, is the ease with which they accept a normal soldering operation. Antimony may be plated directly on a comparatively rough surface and then, because of its high buffability, polished or colored to a high lustre with much less expenditure of time and labor than would be required to produce an equally high finish on the steel base.

Most of the work on this new process has been thus far confined to steel as the basic metal. Laboratory results indicate, however, that there are few exceptions upon which deposits analogous to those obtainable upon steel cannot be achieved.

An old process, but one which has been making important progress, is barrel tumbling. Its essential purpose is to eliminate at least a large part of the most expensive operation in metal finishing, which is hand or wheel polishing. It has made rapid advances and is now widely accepted for large scale, low-cost finishing operations. It is still, however, underestimated as to its breadth of applicability. It is not generally appreciated that tumbling can produce a lustre close to the finish obtainable on the wheel.

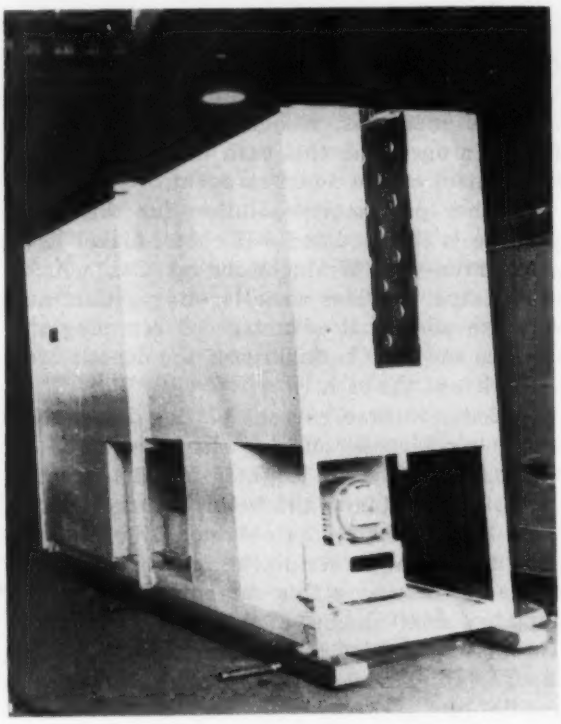
Interest is growing steadily in the use of vacuum techniques. Much is still in the research and development stage, but some vacuum processes are already being used on an industrial scale. Considerable strides have been made in coating of metals by vacuum evaporation, this application having advanced further than any other at present being investigated. It shows promise of widespread industrial use within a few years. A present example is the metallizing of plastic objects, toys and novelties with very thin bright deposits.

WASTE DISPOSAL

The improvement of plating waste disposal practice to avoid stream pollution and sewage system damage has become one of the major problems of the electroplating industry. In many states and communities legislation and enforcement are becoming more vigorous. There are also indications that the federal government will enter into the picture, since waterways pollution is an interstate matter and natural resources are affected. The American Electroplaters Society has set up a research project covering this subject.

A method of depositing zinc, cadmium and tin upon aluminum by chemical displacement has been made public by S. Heiman. A dilute hydrofluoric acid dip is used to remove gross oxide and to activate the surface of the aluminum preceding the immersion dip. The film remaining on the aluminum after the cleaning treatment can be removed by dissolving in 70 pct (by volume) nitric acid at room temperature and rinsing in cold water.

Immersion solutions contain the metal sulfate, hydrofluoric acid or the fluoride ion, and various addition agents. Aluminum alloys successfully plated by the zinc immersion process are 24ST, 52S and 61ST. In cadmium deposition, good agitation of the aluminum was found necessary to produce deposits of uniform, sound

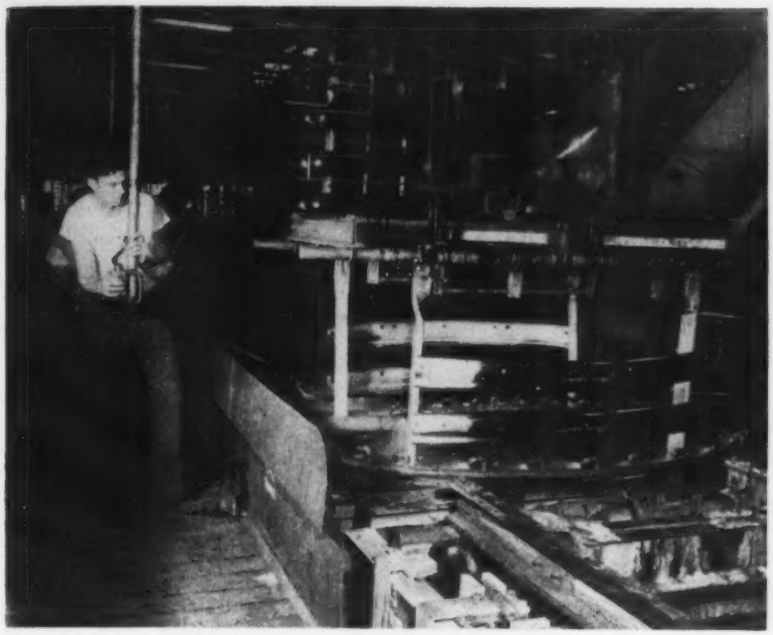


A metal parts dryer, designed especially for the plating field where highly polished surfaces are encountered.

structure, and time of dip was more critical than with zinc. Good agitation and careful attention to optimum dip time were also found essential to successful tin deposition. All deposits were tested by their success in holding copper plates.

Commercial progress has not been rapid on the deposition of nickel and cobalt by chemical reduction from an ammoniacal solution containing hypophosphite; also the deposition of nickel from acid solutions and of cobalt and cobalt-nickel alloys from ammoniacal solutions. However, these methods have been placed in operation and some of the reports are interesting.

L. Gostin reports the deposition of 0.007 in.



Bumpers being given a quick rinse after leaving the chrome plating tank, at Electric Auto-Lite Co.

in 12 hr, and has obtained smooth deposits. Bright deposits may be produced by the use of an addition agent. The deposit is hard, ductile, fine grained and of low porosity. The operation of the bath is not critical. It is said to be highly suitable for work with deep recesses, inside parts and very small parts which are hard to rack and expensive to handle individually. Bulk plating can be done without difficulty.

Further work along these lines has been reported in the deposit of cobalt and nickel as alloys of phosphorus from their metal salts with hypophosphite at elevated temperatures. The deposits are hardenable by heat treatment and seem to show encouraging possibilities.

Experiments in chromium electrodeposition with radioactive chromium by Ogburn and Brenner described a new and important technique, the application of radioactive tracers in the investigation of electroplating problems.

Any chromic acid electroplating bath that has been used contains some trivalent chromium. Whether the metal is deposited from this bath directly from the hexavalent state or through the trivalent state has never been conclusively demonstrated. It was believed that, by tagging the chromium in either of the two valence states with a radioactive isotope of chromium, the radioactivity of the deposit should indicate from which valence state the metal is deposited. Such experiments showed

Operators cleaning and loading tumbling barrels. Although not a new method, the use of tumbling is being continually broadened.

that the chromium is deposited directly from the hexavalent chromium and not from the trivalent chromium present in the bath.

Reich and Snell described di-phase metal cleaners, which are beginning to take hold in the plating industry. An example is Chemclean No. 133 of Chemclean Products Corp.

Sonizon, a nondestructive method of measuring thicknesses, is being used to measure the thickness of the silver deposit on the wearing surfaces of friction bearings. This is an ultrasonic method, a refined application of Sonigage testing methods originally developed by General Motors Corp.

Several stainless steel tube companies are said now to be in commercial production utilizing Bonderite as an aid in drawing seamless tubing. This coating serves a purpose similar to the coating used on mild carbon steel tubing for the same purpose, absorbing lubricant and forming a physical barrier between the surface and the die in the drawing operation. The advantages claimed are higher speeds in tube drawing and reduction of rejects by minimizing scratches and other defects in the metal surface.

An exploratory study of the nickel plating of pressed metal powder parts was made by Graham, Pinkerton, Anderson and Reinhard. The following tentative conclusions were reached:

(1) The plater must take proper precautions to avoid serious contamination of his solutions from drag-over.

(2) Flaw-free appearance will require special procedures, and may require improvements in the fabrication of the compact. One such procedure may call for a heavy copper primary deposit, applied over a buffed surface, and in turn buffed after deposition.

(3) The mechanical preparation of the metal-

Testing a baked enamel finish on a bakelite radio cabinet for its adhesion qualities.

compact surface for plating seems to have some limitations. Greaseless compounds have given the best results to date.

(4) Special precautions are necessary in the rinsing and post-plating treatments, to minimize spotting out on copper and brass plates.

(5) Present information does not indicate that the outdoor service performance, particularly of nickel-chromium coatings, is largely influenced by the preparation of procedures.

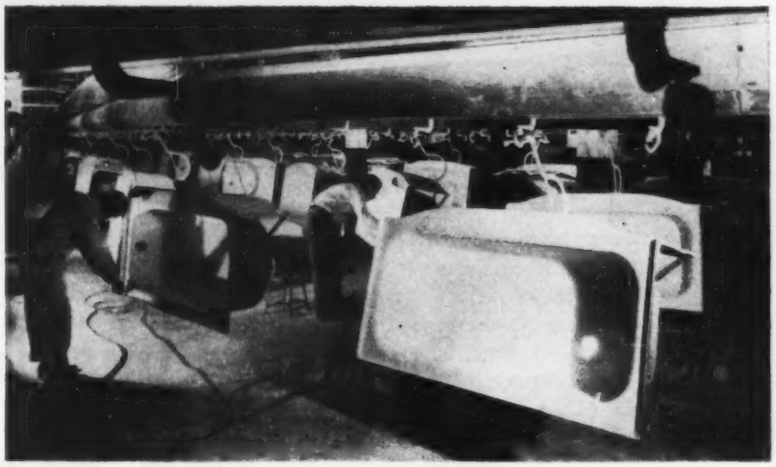
A new self-regulating high speed chromium plating solution was announced by United Chromium, Inc., said to offer higher cathode efficiency, better covering power, less sensitivity to interruptions in current and wider bright plate

Bonderizing of zinc plated parts prior to painting, for better adherence of the finish.

range. The bath [Self Regulating Solution Speeds Chromium Plating, THE IRON AGE, Feb. 16, p. 91] may be used with standard chromium plating equipment. In use at a number of plants, the solution is reported to have cut power costs by as much as one third.

NONMETALLIC FINISHING

Users of lacquers, enamels and synthetic coatings are now fully aware of sharpened competition and the need for improved appearance in their products. Industrial designers and stylists are leaning toward the hammered effect and finishes that produce this effect with one spray coat application. Wrinkle enamels are still considered standard durable finishes and are used with colorful lacquer enamel topcoats.



Bathtubs on conveyor lines enroute to porcelain enameling furnaces. Advances in enameling may result in eliminating ground coats.

Among the newest contributions to industry are flash-baking finishes that can be thoroughly baked in a matter of seconds. Flash-curing synthetic finishes are now available that can be baked for as little as 30 sec under certain conditions.

Recently, the efforts of producers of vitreous-enameling sheets have been directed toward a sheet which can be coated directly with a finish enamel, eliminating the ground coat. In addition to reduced cost, this has the advantage of reduction in total thickness of enamel coating, a major factor in increasing the quality of porcelain-enameled ware.

Frit suppliers have developed titanium-bearing enamels characterized by high coverage, acid resistance, high gloss and extreme surface hardness and abrasion resistance. Current practice has been reported with this type of enamel applied over a ground coat producing a total coating thickness of 6 to 7 mils as compared with coatings in excess of 10 mils a few years ago. However, by direct application of the finish coat, without a ground coat, it is hoped to reduce the thickness to 3 or 4 mils.

An interesting event was the establishment of contact between the National Assn. of Metal Finishers, an organization of job and contract electroplaters, with the U. S. Dept. of Commerce. A conference was held in Washington, D. C., attended by representatives of industry and various divisions of the Dept. of Commerce, during which the discussion covered the following topics:

(1) To have the industry recognized as such by the government rather than being classified along with shoe repair shops, bicycle repair shops, etc.

(2) Standardization allowances for depreciation of job shop equipment. At this time, depreciation is allowed in amounts varying from 5 to 13 years, while the equipment manufacturers claim that an allowance of 7 years should be made.

(3) Ways and means of having the industry show its capacity in order that manufacturing companies should not install plating equipment which would be later used in competition with the job shops.

(4) Ways and means of obtaining information on contracts let by the government for materials requiring metal finishes.

(5) Metal Finishing Manual prepared by the National Assn. of Metal Finishers.

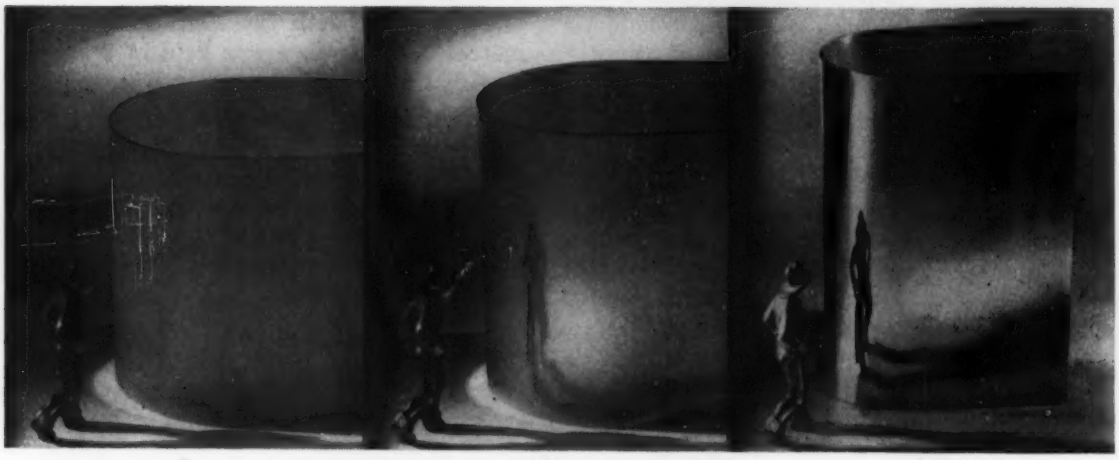
(6) A survey to determine the capacity, investment, capital, etc. of companies engaged in the metal finishing business and preparation of a directory, including the various types of metal finishes and the companies requipped to produce them.

(7) The financing of job plating shops with government assistance.

(8) A program for the education of the small job shop owner in the art of doing business.

(9) The problem of unfair competition within the industry.

It is expected that the industry will, by this continuing contact, be able to improve some of the troublesome conditions which have afflicted this industry for many years.



A B C

FIG. 7—Comparison of Stainless Steel finishes: A—No. 1 finish, a pickled surface that is bright and dense but not reflective; B—No. 2B finish is dense, bright and lustrous, but only mildly reflective; C—No. 4 finish is highly reflective and has a silvery appearance. Photo courtesy Eastern Stainless Steel Corp., Baltimore, Md.

Surface Finishing

STAINLESS STEEL

Methods of buffing and polishing stainless steels involve special practices. The selection of abrasives, recommended speeds and amount of stock removal are discussed in this article, which is the second part of a two-part article.

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FACTORY coated abrasive belts are used in surface grinding and polishing operations on stainless sheet and strip. This practice is a deviation to what was previously considered a cutting tool, with respect to the faces of a grinding wheel. In the point contact system of working metal surfaces, contact is made by the arc of the pressure rolls. The ideal arrangement is to have the work flexed so as to form a double arc of roll and work, resulting in sufficient penetration to remove stock in the form of shavings. In the wide belt sheet grinder, the sheet rests on a beaver board pad which in turn rides on a hardened support roll. Controlled air pressure raises the support roll at each end, bringing the work in contact with the belt. Being compensating, it automatically gives equal working pressures the entire width of the sheet.

A load ammeter indicates the amount of grinding load. Through this device an efficient working point can be determined and maintained by adjusting the pressure on the support roll until the proper power consumption has been reached. When in operation, the work being ground is flexed. This insures belt contact with the work at the grinding point only. These machines, shown in Fig. 5, are built in various sizes to finish sheets 36, 48, 60 or 72 in. wide and any lengths

up to 16 ft. The abrasive belt length on all machines is 20 ft, 3 in.

In the continuous strip grinder the strip is passed through the machine by motor driven reels that wind the strip on coils. Defective sections of strip can be ground as many times as necessary for complete reconditioning by reversing direction of strip and belt travel. Machines are built to handle strip 24, 36, and 48 in. wide; the length of belt being 20 ft, 3 in.

A valuable attribute of belts as compared to rolls in the grinding of austenitic stainless strip and sheet is the cooling rate. When a small amount of abrasive surface is being used, as on a roll, the time for cooling between cuts of the same grains is limited. On a belt greater cooling time is allowed between cuts on the same grains. Since heat tends to weaken the bond, grain loss will be great where cooling time is short. Armco[5] stresses the fact that a belt provides considerably more abrasive surface than either a wheel or a roll. For example, a 10 in. abrasive wheel has a circumference of about 31½ in. When this abrasive wheel is replaced with a resilient work wheel and back stand idler, endless abrasive belts 84 and 168 in. long are employed. Consequently, the available abrasive surface has been made three to five times as long as when using the abrasive wheel.

TYPES OF ABRASIVES

The selection of a grinding wheel for stainless steel is best based upon test. Similar experiences, or the experiences of others on similar operations, aid in obtaining a starting point. Trial by test is preferred since, in the selection of a grinding wheel, considerations other than type of material and type of grinding operation are necessary.

When high tensile material is to be ground, Alundum wheels are suitable. As a rule, very hard and brittle materials require a relatively soft grade of grinding wheel, since the softer grains will enable the worn dull grains to break away and expose new sharp grains. As both hardness and brittleness increase, a finer grain size or a denser structure, is advisable. Soft, tough and ductile materials require a wheel with comparatively wide spacing of abrasive grains. This allows the grains to penetrate to a maximum depth and provides sufficient clearance for the relatively large chips which are removed.

The amount of stock to be removed and the accuracy and finish desired are factors that influence the selection of both wheel grain size and structure. Coarse grain size and open structure are necessary where stock removal is heavy. As stock removal decreases, finer grain sizes and closer grain spacings are better. Better finishes are usually obtained from fine grained wheels with close spacings. However, with proper truing facilities on a machine grind operation, it is possible to produce fine finishes with relatively coarse wheels.

The area of contact between the wheel and the work influences the selection of the grain size, grade and structure. Cylindrical grinding offers an example of relatively small area of contact. Total force between wheel and work may not be great compared to other grinding operations, but the force per unit of contact is relatively small. Wheels of coarse, widely spaced grains distribute the small force over a small number of cutting edges. A grade in the soft end of the range permits dull grains to be torn out of the wheel by light forces.

WHEELS AND SPEEDS

Other factors in wheel choice are: Wheel speed, work speed, the condition of the grinding machine, and the skill of the workman. Table I, part I, showed recommendations of Norton Co., for grinding stainless steels.

Polishing may either follow grinding or it may be an initial operation in obtaining a bright reflective surface. It is essential that all surface defects have been removed so that a good clean base surface of uniform finish and appearance is provided. Where spot grinding is necessary, care should be taken to avoid depressions or grinding marks that cannot be obliterated by the subsequent polishing operations.[4]

A primary operation in polishing is the preparation of the wheel. Wheels are made of sections or layers of circular disks of cloth, usually unbleached muslin. Each section or layer consists of a number of individual cloth disks sewed together in accordance to an adopted pattern or design to obtain the necessary stiffness in the center and flexibility toward the edge. Factory made stitch muslin as well as canvas or felt wheels come trued with nap laid back ready for sizing. However, shop built wheels must first be trued on the polishing lathe spindle with a commercial buff rake or a sharp cutting tool[6] which may be made from an old file. Painting an arrow on the side of the wheel after truing will indicate correct direction of rotation and insure longest wheel life.

The abrasive on glued wheels may include the standard grades of aluminum oxide and silicon carbide. Turkish emery is usually used in the finer grit sizes,[3] but there is some objection to this material[7] due to the possibility of iron contamination which may result in a discoloration of the stainless. The abrasive should be screened for uniformity of size prior to application on the wheel.

A good glue must be used because of the service conditions under which the adhesive must function from the standpoint of shock, temperature, and strength of adhesive bond. A glue graded[1] at 115 millipoises or higher by the

Continued

viscosity test is recommended. Ground glue is preferred since it soaks and mixes more readily than either flake or cake glue. Glue, pot, brushes and additional utensils should be kept clean, and a different brush should be used for each grain size. Commercial cement for built-up wheels, can be used cold. It requires no soaking, and drying time can be reduced to from 2 to 6 hr.

In the use of either glue or cement, the following procedure is usually followed: The adhesive is brushed, with the nap, onto the wheel face, and the wheel is rolled either manually or mechanically in a trough filled with grit, as shown in Fig. 6. Wheel heading machines[4] waste less abrasive, produce more even coatings, and give longer wheel life than hand rolling. The number of coatings depends upon individual practices. The glue adhesive must dry thoroughly before additional coats can be applied.

Wheels are dried[4] and cured in a controlled temperature curing room, having a 50 pct relative humidity and a temperature not exceeding 80°F. At a higher humidity and lower temperature, the glue will remain in the form of a partially dried jelly and will not dry out. Circulation of air in the curing room is another matter closely related to both humidity and temperature. Under properly controlled curing room conditions, 24 to 48 hr are required for drying wheels.

It has been recommended[5] that prior to placing dried wheels into service, the abrasive head should be properly cracked or broken up by striking lightly with a round bar or pipe. This cracking gives flexibility to the wheel head and demonstrates whether the wheel has been properly dried. The wheel head should be struck diagonally at about a 45° angle with the axis of the wheel over its entire circumference. Then the same operation is repeated at a 45° angle from the other side of the wheel. Always use a round bar for this operation since sharp edged tools will tend to chip the wheel head. Static balancing determines wheel shape. An unbalanced wheel will rumble, vibrate, chatter, shed grains on one spot and demand frequent reheading.

Polishing employs a series of grits, the choice of the initial and succeeding grits depending upon the surface condition of the work. Choice of grit should be made so that all previous pits or scratches can be readily removed in the first polishing operation. Grit No. 80 is the usual initial grit size. Rough polishing should continue until a smooth uniform surface is obtained, after which succeedingly finer grits may be employed. The change in grit size may be by 40 numbers.

Equipment for polishing is similar to that employed in grinding. Portable polishing tools usually use a 6 to 8 in. diam wheel with a 1½ in. face, while stationary polishing wheels have a 12 to 14 in. diam with a wheel face of approximately 2 in. Wheel speeds of from 6000[1] to 8000 sfpm, are recommended for polishing. Where lubrication is desired, tallow or any commercial grease stick can be used. In the latter instance, it is well to specify iron free compound for polishing stainless steel. It is considered good practice to eliminate marks remaining from the previously employed grit.

In polishing the stainless steels, the same precautionary measures as in grinding should be employed. Metal removal should be slowly accomplished and overheating avoided by an increase in wheel pressures. Intermediate grit sizes should not be omitted to speed up polishing since following finer grits will not always remove existing lines in a reasonable time. Wheels used

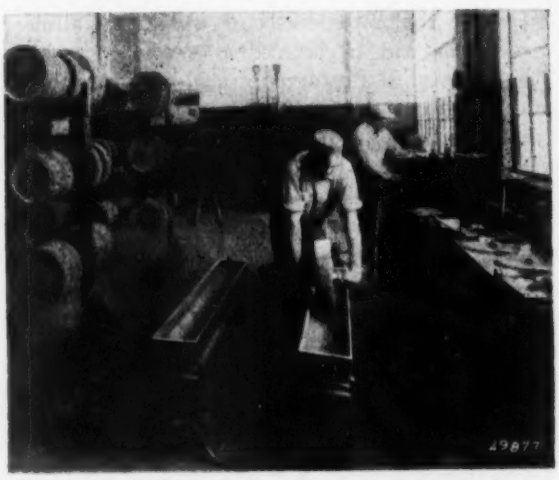

FIG. 6—Polishing wheels are cloth base with glued layers of abrasive. This is a curing room, showing drying racks, grit troughs and glue pots for polishing wheels. Photo courtesy Armco Steel Corp., Middletown, Ohio.

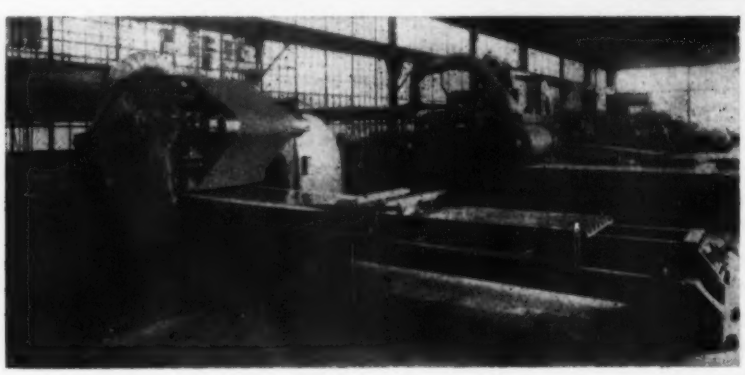

FIG. 5—Stainless steel sheet is belt ground to certain mill finishes. This is a typical wide belt sheet grinding and polishing machine. Photo courtesy Mattison Machine Works, Rockford, Ill.

in the polishing of the stainless steels should not be used for other metals.

In buffing, finishing operations start with a polished surface and finish with a highly reflective bright luster finish. Differences in finishes are shown in Fig. 7. Soft wheels are employed, this being partially accomplished by less extensive sewing of the cloth disks than for polishing wheels. Sewing is confined more to the center resulting in increased flexibility or softness near the periphery.

Excellent buffs are commercially available. They range from buffs designated by their sewing (as concentric radial, radial arc, parallel and squared sewed) to loose buffs with layers of fabric sewed once around the arbor hole only. Standard buff sections are made of approximately 20 plies of cloth. For buffing stainless steels[3] a cloth count of 86/93 is recommended. As with polishing wheels, the buff width is determined by the number of sections used to make the buff. In some cases[3] sewing is omitted on wheels employed in final operations.

Ventilation in buffs prevents scorching or burning caused by the generated frictional heat. Larger buffs on stationary machines are given the proper resiliency by separating the muslin sections of the buff with 6 in. diam x 3/16 in, thick cardboard spacers.

BUFFING SPEEDS

Buffing speeds are usually between 9000 and 12,000 sfpm for cut down buffs, and 9000 sfpm for color buffing. No wheel preparation is necessary, the abrasive being either added to the work or to the wheel in the form of a stick. Buffing is usually accomplished in two separate operations. The first, cut down buffing, requires a fast cutting aluminum oxide supplied in stick or cake form. The second, color buffing, uses either levigated[3] alumina or green chromic oxide. The last operation will produce the deep mirror finish so desirable on stainless. Sulfur or iron contamination[1] will cause discoloration.

In matching weld areas with machine finishes the following may serve as a guide.[4] A No. 4 finish may be approximated by using a No. 120 aluminum oxide grit applied on a soft wheel using a lubricant. A No. 6 (tampico) finish is obtained by starting with a No. 4 finish. Upon this is applied a mixture of cylinder oil and powdered pumice made up to the consistency of a paste. The action of a rotating tampico brush under light pressure will bring out the desired results. A No. 7 finish may be matched with a very fine abrasive on a soft muslin wheel, followed by buffing.

A buffing or polishing wheel has three important dimensions, the diameter, face width, and arbor hole diameter. In specifying these dimensions on purchased or prepared wheels, it is necessary to consider the size and shape of the article to be finished and the type of lathe on which the wheel is to be used. Both the diameter and type of lathe spindle should be supplied. The correct arbor hole permits easy removal and placement of a wheel on its spindle, resulting in uneven running during operation. The face of periphery of the wheel is made concentric with the arbor hole; thus, where reboring of the arbor hole is necessary, the wheel is refaced so that concentricity is established. Knowledge as to the lathe spindle diameter will decide the proper wheel. Too large or too heavy a wheel may have damaging influences on both the spindle and the motor.

WHEEL CONSTRUCTION

The diameter of the wheel is important since it is a determining factor in time of finishing. Too small a wheel will increase the time required to produce a specific finish. When a wheel has been reduced in diameter to a predetermined point by long service, continued use is economically unsound. Partial solution is the removal of these worn wheels to a higher speed or variable speed lathe.

The face width of a wheel is important in that it determines the effective working area of the wheel. Too narrow a wheel increases the labor required, and laps may be produced that may have to be removed by extra labor. The increased burden on a narrow faced wheel causes more rapid wear so that increases in labor costs can be expected. The use of too wide a wheel may overload the lathe. Some work has been done to obtain wheels that have wheel faces formed to fit the profile of the objects to be finished. This practice is limited to the permissible width of wheel face recommended for the specific lathe on which the work will be performed.

Finishing of the stainless steels is a tremendous field that requires research as is approportionated to the various fields of fabrication. The subject matter as dealt in this article is far from complete. These characteristics of the stainless steels should be kept in mind:[5] (1) Stainless steels possess greater hardness and abrasion resistance than most carbon steels. (2) Stainless steels have less than ½ the thermal conductivity of carbon steels. (3) The chromium-nickel stainless steels have approximately 40 pct higher coefficient of expansion than carbon steels.

References

[1] "How to Fabricate Armco Stainless Steels," Armco Steel Corp., Middletown, Ohio.

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[3] "Handbook on Stainless Steels," Allegheny-Ludlum Steel Corp., Brackenridge, Pa.

[4] "Grinding Wheels and Their Uses," by J. Heywood, Penton Publishing Co., Cleveland, 1942.

[5] "Surface Finishing of Armco Stainless Steels," Armco Steel Corp., Middletown, Ohio, 1948.

[6] "Grinding Wheels—Information and Selection," Norton Co., Worcester, Mass.

[7] "Fabrication of Republic Enduro Stainless Steels," Republic Steel Corp., Cleveland.

DESIGNING Failure-Proof

By J. J. SLOAN
Production Design Engineer
North American Aviation, Inc.

THE design of sheet metal tank assemblies for aircraft involves considerations of fluid volume requirements, space allotted, location within the airframe, frequency and amplitude of vibrations, and material and structural strengths. These containers vary in weight, shape, and disposition at all times during flight because of fluid consumption, temperature, and pressure changes; and present as great a variety of problems as are encountered anywhere in the airplane. The greatest influence upon the design is the assignment of space. When this is properly determined it makes possible the fabrication of simple tanks that pay off in ease of manufacture, maintenance, and freedom from leakage.

Many failures in tank assemblies occur through *oil canning*, a condition of slackness or buckles in flat areas of tank walls and bulkheads caused by vibration and sloshing. Cracks appear at the edges of these areas where beads and bends with relatively small radii cause abrupt damping of the oil canning action. The attachment of any object to a flat area of the tank shell without outside support tends to concentrate stress at the points of attachment because of the inertia of the object. Even a nameplate can cause failure under this condition, with spot-welds pulling out, not as a result of faulty welds but because slackness or buckles stress the spot in tension.

The limited production quantities of aircraft tanks, inadequate tooling for irregular shapes, and the variations in trim lines contribute to difficulties in welding. Faulty workmanship can be held to a minimum by inspection and adequate tooling. Poor workmanship can be reduced in design by specifying the optimum gages for forming, generous tolerances for fabrication, and a careful analysis of welding.

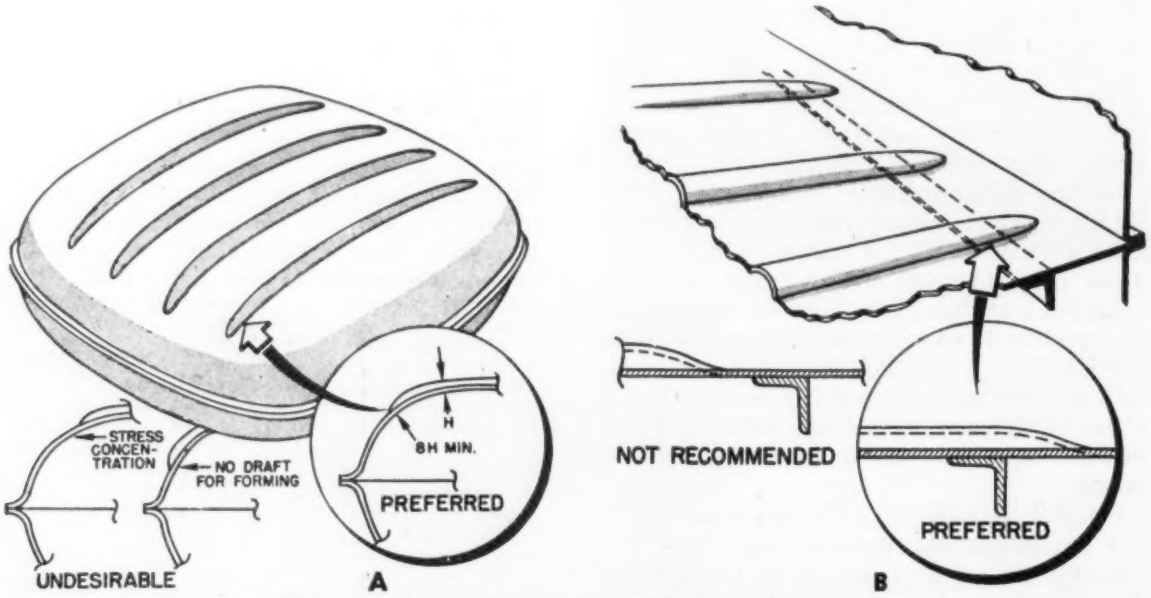

FIG. 1—A—Stamped beads or stiffeners should stop at the beginning of the curve of the tank to eliminate stress concentrations. B—Ends of beads or stiffeners in flat panels should overlap bulkheads.

Aircraft Tanks

Available space within the airframe is the greatest factor influencing the design of aircraft tanks. Other considerations are volume requirements, vibration intensities, shape, material strengths, welding sequences, and location within the airframe.

A sphere is the ideal shape for a tank to meet all conditions of strength, ease of fabrication and vibration resistance. However, few designs permit the use of this shape. The end result is a compromise, a tank with no particular shape, size, or weight, yet carrying a maximum quantity of liquid and taking advantage of space available in nooks and crannies around the airframe. This involves a multiplicity of pieces held together by seam and fusion welding, rivets, and spot welds. Other simple shapes like the cylinder and oval are easy to fabricate with a limited number of pieces, and hold up well in service. The box does not lend itself well to vibration resistance since the flat sides need stiffening to keep them from canning. Therefore, a compound curvature is preferred, and single plane curves of large radii should be beaded for strength. In general, the fewer the flat areas, the better the tank.

Stamped beads or stiffeners must be designed so that stiffness will be given to the area. Their structure must allow gradual transition into adjacent areas to eliminate stress concentration at their ends. Where the beaded area is joined by a curve of relatively small radius, the bead should stop at the beginning of the curve, Fig. 1A. All beads should fair into the tank wall with end radii not less than eight times the depth.

The ends of beads in flat panels should overlap stiffeners or bulkheads to prevent failure through flexing at the ends of the beads, Fig. 1B. The cross-section of the bead should be uniform, or change only gradually throughout its length to prevent stress concentration, Fig. 2. Cross-sectional radii should be as large as possible. To prevent fatigue failure as a result of thinning the metal, beads should not be stretched too deep in relation to their width.

A frequent source of failure of tank struc-

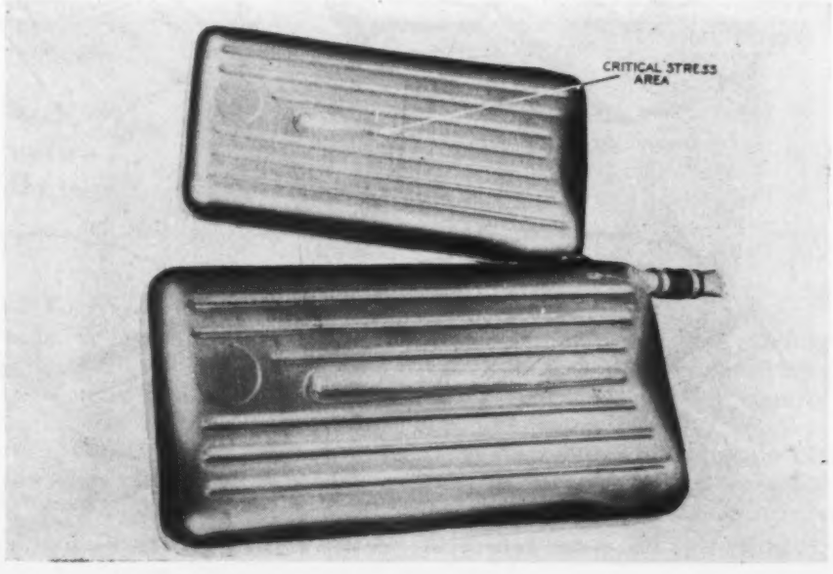

FIG. 2 — Gradual changes of cross-section, reduce stress concentrations.

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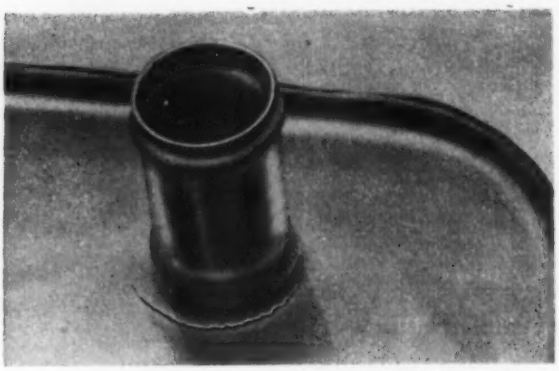

FIG. 3—A relatively heavy mass welded to the flat area of the tank shell has caused this typical failure.

Design Considerations

(1) Include adequate space for tanks in the original design of the airframe.

(2) Use spherical, cylindrical or oval design, curve for stiffness, avoid flat areas. Use large radii for all bends except burn-down flanges.

(3) Attach relatively heavy masses over wide areas to distribute strain.

(4) Use thickest possible materials for rigidity and ease of fabrication.

(5) Do not mix weld types. Keep gages equal at welding. No spot-welds in tension.

tures stems from locating a relatively heavy mass in the tank shell or bulkhead without adequate support. Fig. 3 shows a typical failure, a pipe welded to the flat end of a tank. The preferred method of attachment of such items is to weld a threaded fitting onto a boss raised or impressed in the shell. The less desirable but still satisfactory method is by welding the pipe to the tank with a brace. However, during handling such pipes are often damaged and must be replaced.

Sumps, pumps, valves, and other heavy items tend to vibrate at their own rate and should be rigidly tied to the rest of the structure or directly to a tank supporting area so that the amplitude of vibration of such objects is the same as that of the whole tank. The doubler, or other reinforcements used for support, must distribute the concentrated load into areas of relatively low stress to prevent fatigue cracks.

Bosses, impressed in tank shells for attaching inlet or outlet fittings or tubes, should be carefully oriented with respect to the draft angle required for drop hammer forming. For rigidity they should be located in a curved surface. Also, since the flange around the hole is usually turned up by hand operated tools, it should be perpendicular to the surface of the flat boss.

Cutouts in baffles for drainage are troublesome because of the expense of proper fabrication. The cheap method, Fig. 4A, is unsatisfactory in all respects, a free edge being subject to cracking. Making the cutout as in Fig. 4B, requires a radius, R, at least five times the flange width F, for most materials. The alternates are to add special stiffeners around the cutout or to

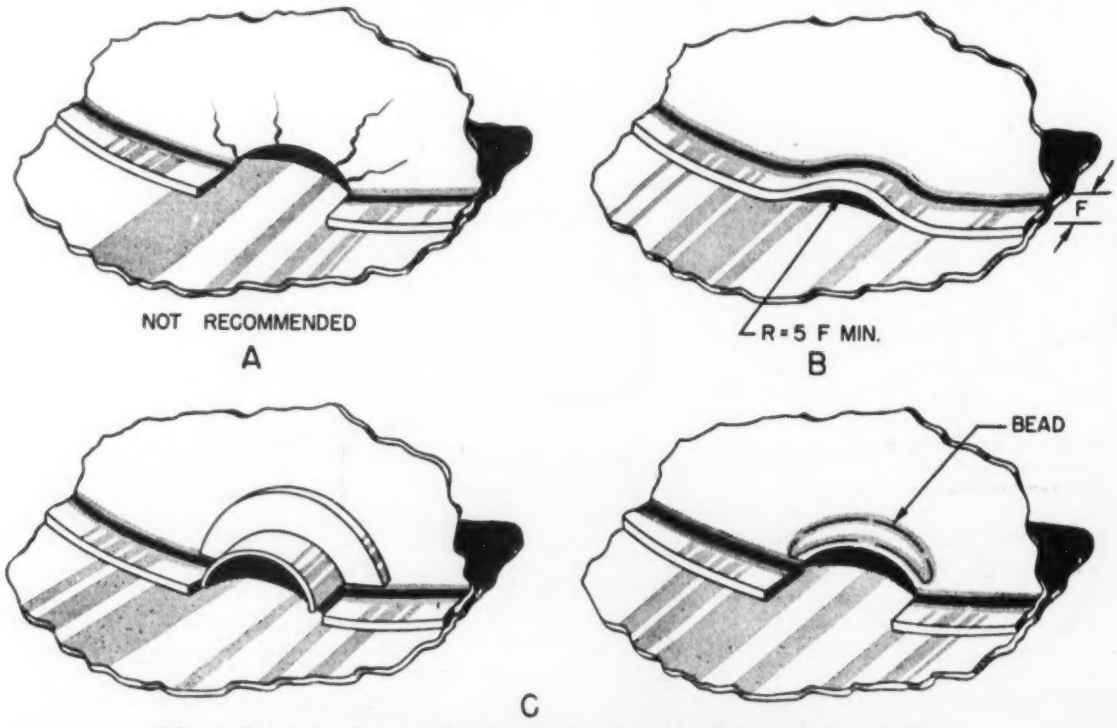

FIG. 4—Cutouts for drainage should not leave a free edge that is subject to cracking.

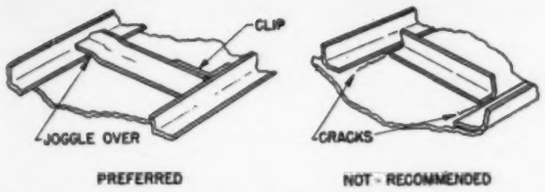

FIG. 5—To avoid rupture or strains, stiffener ends must be tied to adjacent structure.

place a bead around the edge, Fig. 4C, or to add internal or external stiffeners around the cutout or to place a bead around the edge. Internal or external stiffeners on tank walls, bulkheads or baffles must not be allowed to stop short of but must be securely clipped to or joggled over adjacent parts, as shown in Fig. 5.

Although the weight of materials in the thicker gages is disadvantage, their use pays off both in fabrication and service life of tank assemblies. The optimum gages for drop hammer forming of all materials are 0.040 to 0.051 in. The rigidity of the heavier gages is desirable in reducing *oil canning*.

The welding of tank assemblies is subject to the accuracy of preceding forming and trimming operations. The designer can help minimize the difficulties by proper analysis of the type of welding employed. Resistance and fusion welding should not be mixed. They are usually accomplished in different departments with extra handling. Resistance welds can be cracked open when fusion welding is subsequently done too close to the first beads.

There is a problem of repairing leaky resistance-welded seams. On most tank assemblies, once the resistance welded seam is broken the entire joint must be fusion welded to insure proper sealing. Because of this feature each assembly should be seriously considered for fusion welding at all joints. Fusion welding of dissimilar metals should be avoided as much as possible because of uneven rates of thermal expansion.

Where joint design requires both resistance and fusion welding, the latter is limited to the arc method to eliminate trapping flux between adjacent parts. Arc welding also requires that the total thickness of metal in the joint be constant throughout the length of the joint, hence alternating from two to three thicknesses of metal is undesirable. This is for reasons of efficiency and economy since the shielded arc welder requires resetting at each variation.

Wherever possible the thicknesses of materials brought together for fusion welding should be equal because the heat required to fuse the thicknesses is different. The butt-joint is unsuitable for gages 0.032 in. or less because too many times the edges are burned away requiring much filling to repair. Even when tacked at close intervals thin materials buckle severely when heated. The flange-type joint in Fig. 6 is preferred for all gages, but especially for gages 0.032 in. and less. Making a butt joint over a third sheet, shown in Fig. 6B, is undesirable because of the difficulty in fusing the butt joint to the sheet underneath, and possibilities of leakage.

The flange joints should be brought together as shown in Fig. 6A. Where the bend radii are small, thin gages, the resultant *burn-down* fuses well into the plane of the metals brought together, Fig. 6C. Where the thicker gages call for large bend radii, the joint may not fill up as at 6C, and will be subject to fatigue as the bend radii flex under vibration, Fig. 6D. It is essential that this type of flange be as narrow as possible because cracks occur across such welds.

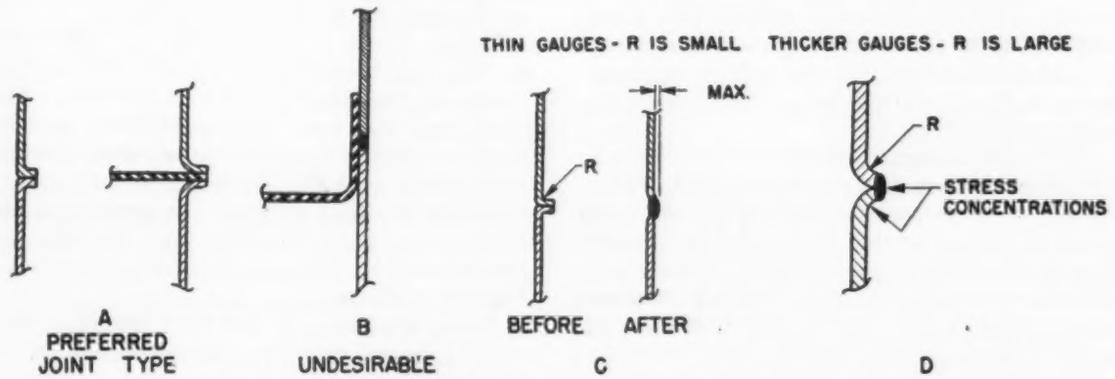

FIG. 6—In designing for welded joints, precautions shown by above details should be observed.

especially at sharp curves.

Before spotwelding, tanks should be carefully analyzed to be certain that no spot will be placed in tension. Spots in tensions pull out when *oil canning* occurs in adjacent areas. It has been found necessary in some cases to replace the last spot in each row of stiffeners with a screw nut, and "O" ring combination because of tension loads.

Chrome Magnet Steel

By L. H. SEABRIGHT
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Care in casting, working and annealing magnet steel is needed for maximum magnetic characteristics and workability. Tests show importance of proper heat treatment of a 3.5 pct chrome steel.

METHODS of melting and rolling 3.5 pct Cr steel are similar to those used for tool steels of like composition. Exceptions arise from the fact that even greater care must be exercised in casting, working and annealing the steel in order to obtain the desired maximum magnetic characteristics along with maximum workability.

Chromium magnet steels are generally melted in either arc or induction electric furnaces. Where possible, it is desirable to break down the steel ingots by rolling to the desired section, before allowing the ingot to cool. Surface defects are generally removed by grinding. Rolling temperatures at the start will range from 1800° to 2100°F, and finishing temperatures from 1300° to 1700°F.

Many magnets require forming or machining to attain final dimensions. For the maximum output from a magnet steel, a high as-rolled hardness is desirable. If any machining is to be done on the magnet, it is necessary to anneal it before machining. This annealing operation defeats the purpose of having a high original hardness and adds an extra operation to the high cost of not forming the magnet.

By a carefully controlled annealing process, it is possible to produce magnet steel which will not only cold form and machine easily and consistently, but also produce magnets within approximately 5 pct of the maximum energy product for the steel. A comparison of microstructures and hardnesses obtained in various samples of 3.5 pct Cr magnet steel is shown in Fig. 1.

Sample A was not heated through sufficiently to bring all the carbides into solution, as evidenced by the nonuniformity of structure. The steel appears to have been cooled slowly enough. However, since the carbides were not in solution, satisfactory annealing is impossible and a hard irregular structure results. The grain structure shows up as rough fracture when the bars are sheared, which gives immediate indication of poor forming qualities.

Metal structures of this kind are very difficult to form and machine, although they will make satisfactory magnets. A comparison of the magnetic characteristics (Table I) of steel A with steel C shows negligible difference. However, in steel A the structure consists of mixed coarse and fine lamellar pearlite and some network carbide, while the structure of steel C consists of the desired finely spheroidized condition.

Sample B exhibits a slightly over-annealed structure. The uniformity indicates that the steel has been heated through, but the high degree of spheroidization indicates that the rate of cooling has been slower than desirable. For comparison, sample D is shown as a characteristic structure

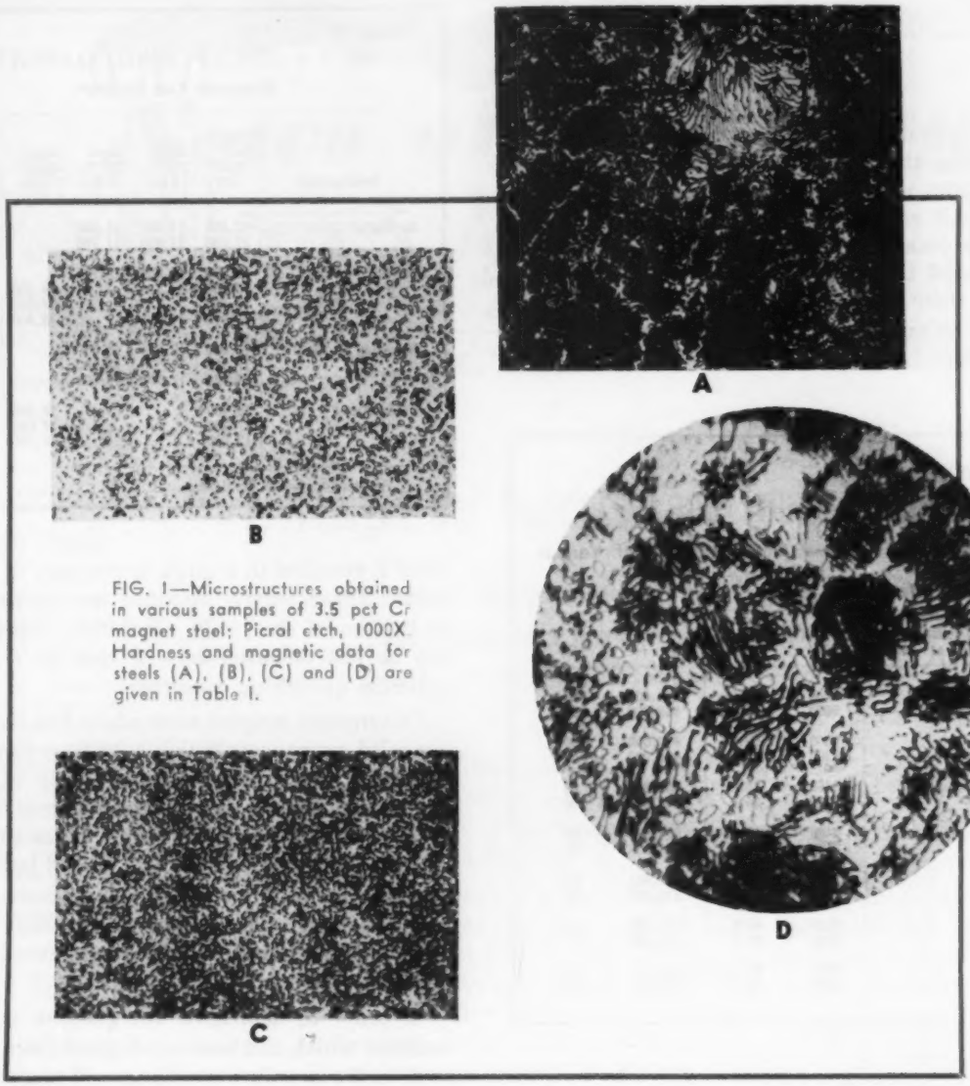


FIG. 1—Microstructures obtained in various samples of 3.5 pct Cr magnet steel; Picral etch, 1000X. Hardness and magnetic data for steels (A), (B), (C) and (D) are given in Table I.

of steel which has been severely overannealed, often referred to as *spoiled*. Steel in this condition has such a large grain structure that it is badly weakened and will fracture in cold forming.

Magnet steel suitable for cold forming or machining must be annealed to a hardness of 20 to 27 Rc. It is important that the annealing be uniform in order to form and machine the steel satisfactorily and still obtain good magnets. When magnet steel is received in the as-rolled condition, an annealing cycle is required. After the steel has just heated through, the heat should be shut off and the load allowed to cool in the furnace with the door open, then withdrawn from the furnace while still red hot, and allowed to cool to room temperature in the open air. The rate of cooling will be influenced by the quantity of steel being annealed. For example, loads of 100 lb or greater can generally be cooled in open air, while smaller loads may require control of the cooling rate in order to obtain the desired hardness.

TABLE I

HARDNESS DATA

Hardness[1] and Magnetic[2] Data for 3.5 Pct Cr Chrome Magnet Steel

Steel Tested	Hardness, Rc	Residual Flux Gausses	Coercive Force Oersteds
3.5 pct Cr, as rolled	35-41	9500	63
Steel A	29-32	8960	66.3
Steel B	12-14	9500	58.3
Steel C	22-23	9000	66.0
Steel D	10	9600	52.0

[1] Hardness obtained heating to 1550°F and quenching in oil.
[2] Magnetizing force, 200 Oersteds.

The generally accepted heat treating procedure for 3.5 pct Cr steel is to heat to 1525°F and quench in oil. As there is substantial variation between different lots of magnet steel, a series of tests were run to determine the ideal heat treatment for a batch of magnet steel which was overannealed to an average hardness of 15 Rc. Sample bars 10½ in. long were sheared from ½ x ¾ in., 3.5 pct Cr chrome magnet steel.

Residual induction and coercive force for the bars was determined after heating 5 min at 1510°, 1525°, 1540°, 1555°, 1570°, 1585°, 1600°F. At

the temperature producing maximum magnetic properties the soaking time was varied from 2 to 15 min, and the resulting residual induction (Br) and coercive (Hc) force were measured. Results obtained after oil quenching from the designated temperatures are given in Table II. Using 1600°F as the optimum temperature and oil quenching, the results shown in Table III were obtained.

TABLE II

HEAT TREATING MAGNETS

Residual Induction and Coercive Force at Various Temperatures

Temperature (5 min at heat)	Br	Hc	Br x Hc	Rc
1510°F	9000	52.0	450,000	54
	9000	50.00	468,000	52
1525°F	9000	55.00	491,000	60
	9100	54.0	495,000	59
1540°F	9150	55.0	503,200	58
	9100	56.0	509,600	60
1555°F	9100	56.0	509,600	59
	9100	58.0	527,800	61
1570°F	9000	59.0	531,000	61
	8800	59.0	519,200	60
1585°F	8800	60.0	528,000	63
	8600	61.0	524,600	63
1600°F	8600	61.0	524,600	60
	9200	59.0	542,800	63

These tests indicate the need for a higher quenching temperature for the softer steel. The generally accepted fact that magnet steel should not be soaked is shown by the second series of tests where the best results were obtained with a soaking period of only 2 min. Attempts at quenching these magnets at temperatures in excess of 1600°F resulted in a large percentage of cracked bars. These results obtained are characteristic of this lot of steel only. However, similar tests can be run on other lots of steel to determine optimum quenching conditions.

TABLE III

EFFECT OF TEMPERATURE

Residual Induction and Coercive Force

Time (at 1600°F)	Br	Hc	Br x Hc	Initial Rc	Final Rc
2 min	9100	58.0	527,800	15	58
	9000	59.0	531,000	16	61
4 min	8800	59.0	519,200	17	59
	8300	60.0	498,000	19	60
6 min	8800	58.0	510,600	15	60
	8500	60.0	510,000	16	61
8 min	8600	61.0	524,600	17	64
	8500	59.0	497,500	13	62
10 min	8650	61.0	517,650	18	63
	8350	60.0	501,000	19	61
15 min	8100	62.0	502,200	16	62
	7900	64.0	505,600	23	64

TABLE IV

HOT V. COLD FORMED MAGNETS

Fluxmeter Test Results*

Pretreatment	Hardened 1560°F Oil	Aged 250°F—3 hrs	Aged 250°F—6 hrs	Aged 350°F—1 hr	Aged 350°F—2 hrs
As Rolled	17,000	17,000	16,800	.....	.....
	17,600	17,600	17,700	.....	.....
Hot Formed 1300°F	16,900	16,800	16,700	.....	.....
	16,800	.....	.....	16,600	16,200
	17,400	.....	.....	17,000	16,800
	17,200	.....	.....	16,800	16,500
Annealed Rc 20-27	17,000	16,900	16,800	.....	.....
	17,300	17,300	17,300	.....	.....
	17,000	17,100	16,900	.....	.....
Cold Formed	16,900	.....	.....	16,500	16,200
	17,200	.....	.....	17,000	16,600
	17,000	.....	.....	16,700	16,300

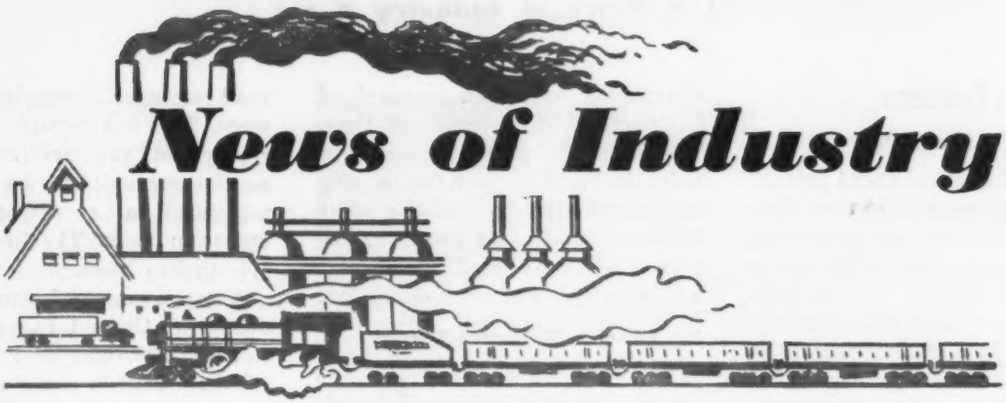
* Results are given in Maxwells.

To renovate magnet steel which has been over-annealed or magnets which have been improperly hardened, the bars are heated slowly to 1850°F and allowed to soak through to a uniform temperature. The furnace is then shut off and the door opened. The red hot magnets should be removed from the furnace immediately and allowed to cool in the open air. This will give a resulting magnet of 40 to 45 Rc hardness, which is in excellent condition for hardening.

In order to determine the relative merits of magnets which had been hot-formed from magnet steel in the as-rolled condition, and magnets cold-formed from annealed stock, the series of tests shown in Table IV were run. The tests indicate that there is negligible difference between results obtained on the hot-formed magnets and those which had been cold-formed. All readings were taken on an open circuit Fluxmeter.

For a combination of good forming, machining and magnetic characteristics in 3.5 pct Cr steel, a uniform, finely spheroidized structure and a hardness of 20 to 23 Rc is desired. Magnetic characteristics of a steel hardened to these standards will be about 5 pct lower than obtained in hardening steel from the as-rolled condition. This shows that a carefully controlled anneal produces relatively good machinability and forming qualities, with negligible sacrifice of magnetic characteristics.

The heat treatment tests indicate the need for slightly varying heat treating cycles in different lots of steel. Indications are that the annealing cycle best suited to 3.5 pct Cr chrome steel is to heat to 1525°F until the steel is heated through, followed by a cooling cycle rapid enough to obtain the desired hardness.



No Thanks

Pittsburgh—John L. Lewis' invitation to join in a mutual aid pact for "common defense against industrial interests" drew a flat rejection from the CIO United Steelworkers of America. USW president Philip Murray wrote Mr. Lewis that his proposition would serve no useful purpose.

A $500,000 check was sent by the USW to the coal miners union as aid in the recent strike. The check was returned with Lewis' thanks.

Pension Plan Approval Voted

Pittsburgh—Voting 97 pct in favor and 3 pct against, the stockholders of the Pittsburgh Steel Co. approved pension programs for employees represented by the CIO United Steelworkers of America and salaried employees.

Ford Hires Monroe Workers

Detroit—Workers are being hired to staff the Ford Motor Co.'s new Monroe plant which will produce head lamps, coil springs, running boards, and wheels. Hired already were Kelsey-Hayes men released to Ford. They are expert die casters and maintenance men.

Packaging Machinery Dinner Set

New York—The Packaging Machinery Manufacturers Institute's semi-annual dinner will be staged on Monday evening, April 24, in the Sheraton Hotel, Chicago. Program committee chairman is G. Radcliffe Stevens, of the Elgin Manufacturing Co.

Freight Car Builders Face Tough Problems

Lack of orders is biggest headache . . . But trend toward production of cars in railroads' own shops alarms the independents . . . Backlogs disappearing—*By JOHN DELANEY*

Pittsburgh—Bad as business is these days, lack of orders is not the only worry of the independent railroad car builders.

Of equal concern is the proportion of all available business the railroads are taking into their own shops. The car builders don't like to think that this is a trend, but orders placed during January and February give them little comfort.

Orders during February totaled 9075, of which 3775 were placed with the car builders and 5300 in railroad shops. January orders totaled 9385—5056 with car builders, 4329 in railroad shops.

Of the 26,055 car order backlog as of Mar. 1, according to American Railway Car Institute statistics, 15,387, or more than 59 pct, will be built by the railroads themselves. The Union Pacific announced recently that of 4000 new cars it will begin work on this spring, 3000 will be produced in its own shops.

Backlog Disappears

That's bad news to an industry already hanging on the ropes, backlog-wise. At this time last year, the backlog totaled 85,976 cars. But with new orders for the entire year of 1949 totaling only 6248, this backlog has all but disappeared.

Domestic freight car deliveries last month were 2046, compared with 2395 in January and 10,315 in Feb. 1949. Of February deliveries, 917 were from the car builders and 1129 from railroad shops.

Freight car delivery figures for 1949 tell an interesting story. Of the 92,562 total, 62,955 cars were produced in car builders' shops

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Lone Star to Build Pipe Plant

Dallas, Tex.—A $5 million bond issue and sale of 592,185 shares of common stock were approved by the stockholders of the Lone Star Steel Co. to finance the next to final phase of the company's master plan for an integrated steel mill.

Construction of a cast iron pressure pipe plant will use up about $1.5 million of the proceeds derived from the move. The plant will add about 200,000 sq ft of plant space to the company's property. The balance of funds received will be used to retire indebtedness and increase working capital.

Car Builders Problems

Continued from Page 99

and 29,607 in railroad and private line shops. That's more cars than the railroads have ever produced, according to records going back to 1913. It represented just a shade under 32 pct of the total. The two years that came closest were 1948, when the railroads produced 29,444 cars, 26.14 pct of the total, and 1923 when 29,501 cars were built by the roads, or 16.78 pct of the overall. There have been years when building by railroads was higher, percentage-wise, but these included depression years and the war-time year of 1944 when car builders were busy with defense orders.

Problem's Under Fire

The problem of the car builders is two-pronged: (1) To convince the railroads that they should buy more new cars, and (2) To reverse the current order pattern. They're plugging away at both.

There will always be some business for the independent car builders, since at least 75 pct of the Class 1 railroads are completely dependent on them for their equipment. However, practically all of these roads are the smaller ones which to date have not been doing much ordering. Historically, they account for a smaller percentage of car building business than their number would indicate. The car builders have received the bulk of their orders from the other 25 pct.

Producer Takes Loss

Several car builders have diversified their production in an effort to soften the impact of depressed business periods such as they have been experiencing in the last year. Others are thinking of doing the same. The reason is more than just financial. The car builders are concerned about their skilled workers. They say you can't expect good workmen to struggle along in a feast-or-famine industry when steadier work is available elsewhere.

During the past year, pencil-sharpening has taken up much of the car building executives' time. The railroads' pressure for price reduction and competition among themselves has reached the point where at least one producer reportedly has accepted business at a loss to keep his plant operating.

No Precise Formula Found

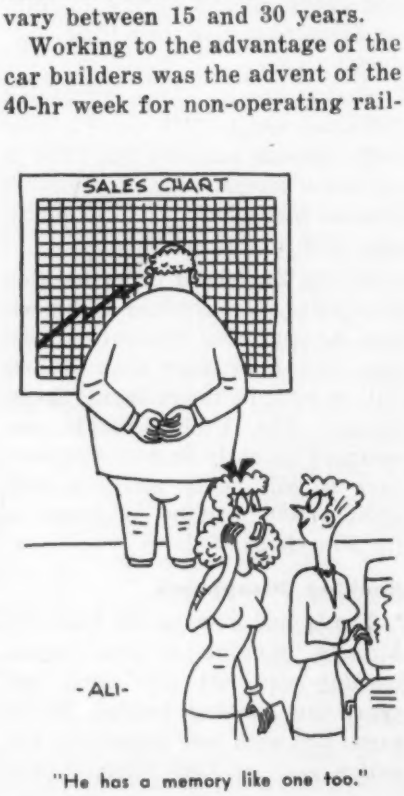
The car builders argue that this should not be and that they can produce cars cheaper, even with a reasonable profit, than can the railroads. A sore point with them is the railroads' system of cost accounting. If all costs were taken into account, they say, the roads would find that it costs them more to build in their own shops. The railroads, of course, take a contrary view.

The economics of new-car buying versus repair of old cars is one to which car builders and railroads have been devoting considerable time. No one seems to have found the precise formula for deciding when its cheaper to buy a new car than to repair an old one. Depending on many variables, including type of car, design, usage and maintenance policy, best estimates are that this age factor will vary between 15 and 30 years.

Working to the advantage of the car builders was the advent of the 40-hr week for non-operating railroad employes, formerly on a 48-hr week. This has increased car labor repair costs to the railroads, whereas the car builders have not experienced a corresponding increase in costs. The 40-hr week is old stuff to them.

Average age of freight cars owned by Class 1 railroads as of Jan. 1, 1949, was 20 yrs. Of the 1,762,239 still in service, 19.20 pct were over 30 yrs old; 15.48 pct 26 to 30 yrs; 18.93 pct 21 to 25 yrs; and 8.85 pct 16 to 20 yrs—a total of 62.46 pct 16 to more than 30 yrs old. The fleet as of Jan. 1, 1950, had decreased to 1,749,736. Age of passenger train cars as of Jan. 1, 1949, averaged 26.19 yrs. Nearly 41 pct of these were over 30 yrs old.

Resume Your Reading on Page 99



"He has a memory like one too."

Jallopies Run Last Mile To Scrap Graves at Pre-War Speed

Detroit—The war and post-war era of veneration to the doddering jallopy because of the scarcity of newer automobiles is past. The ancient vehicles are sputtering to the nation's scrap heaps at about the pre-war rate. R. L. Polk & Co. statistics show that 1,220,041 passenger cars and 484,038 trucks were junked in 1949. The 25 year average is 1,601,940 units per annum.

Scrappage amounted to 25.2 pct of all new cars registered in 1949, or 3.45 pct of all cars on the road. Vanished from the highways in '49 were 384,038 trucks, or 50.3 pct of all new trucks sold and 6.4 pct of all trucks in operation. The 25 year average scrappage rate is 258,980.

Rust Co. Equips Brazil Plant

Pittsburgh—Control equipment and accessories for a battery of soaking pits at the Brazilian National Steel Co. plant at Volta Redonda, Brazil, is being shipped by the Rust Furnace Co. As an additional fuel source, the Pittsburgh company recently furnished a fuel oil system and burners for the Brazilian 3 pit furnaces, originally designed for coke and blast furnace gas.

Navy Develops Titanium Alloy for Use in Jet Planes

Washington—A new lightweight titanium alloy, as strong as high-strength steel and only half as heavy, has been developed by the Navy Bureau of Aeronautics for use in new jet planes.

The alloy, composed basically of 5 pct chromium, 3 pct aluminum and the remainder titanium, possesses the advantageous physical properties of several metals now used in aircraft.

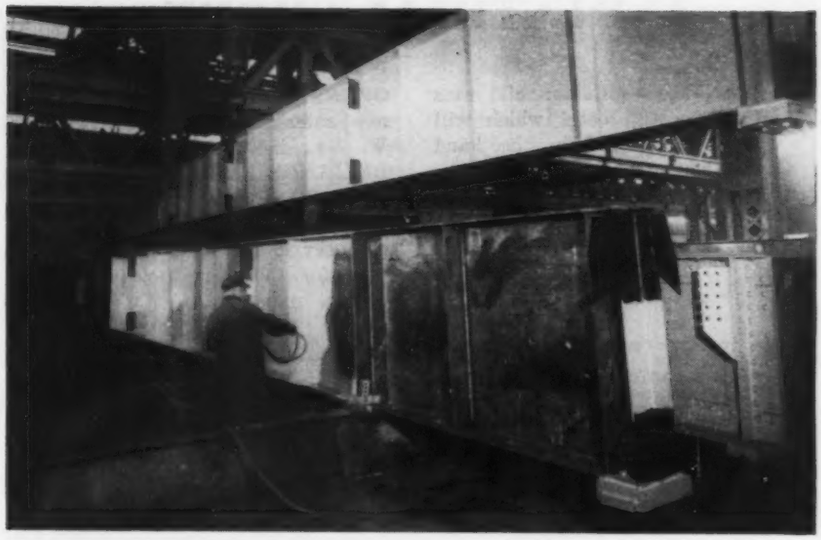
In addition to its high strength and light weight, it is highly resistant to corrosion and, more important, it retains its basic properties at high temperatures. Other metals now in use, including aluminum and magnesium, do not retain their basic properties at high temperatures.

Developed under a Bureau of Aeronautics program dating back to early 1946, the new allow is being used in parts of new jet planes where strength at high temperatures is of major importance. These parts include turbine blades, tailpipe shrouds, engine fire walls, and in the engine itself. Its use will make possible the improvement of several flight characteristics, including rate of climb, range, payload and maneuverability.

Budd Profits Break All Records

Philadelphia—The largest sales and greatest profits in the history of the Budd Co. were announced recently by Edward G. Budd, Jr., president. Total sales during 1949 were $266,633,612 and net profits were $15,038,115.

In commenting on the year's operations Mr. Budd stated that four-fifths of the company's sales were to automotive customers. This makes it obvious that the future prospects of the company must be related in a large measure to the outlook of the automobile industry as a whole. He said that the major opinion is that the automotive industry will enjoy another good year.



NEW TYPE GIRDERS: Welded deck plate girders for the Connecticut's new Commodore Isaac Hull Bridge being spray painted at the Ambridge, Pa. plant of the American Bridge Co. At lower right is more conventional riveted span.

Anti-Monopoly Committee Sets Sights on Big Business

Washington—The opening shot in the latest congressional campaign against "big business" is now scheduled to be fired Apr. 17.

Rep. Celler, D., N. Y., chairman of a House anti-monopoly subcommittee, said last week we had invited top officials of the U. S. Steel Corp. to spend about a week on the witness stand to explain why the steel industry is big business.

Mr. Celler and David Cushman Coyle, subcommittee investigator, are sponsoring bills to limit the size of business firms to what they call "the limit of technology." Celler maintains that if there is no technological reason for a company to be large in size it should be broken up.

Company Rids Self of Debt

Cleveland—Payment in 1949 of its final $2 million in bank loans brought the National Malleable & Steel Castings Co. out of indebtedness for the first time in years. Net profit listed for '49 was $2,624,045.

A reserve of $600,000 for future inventory losses was used to offset declining scrap prices in 1949. Net sales were $34,604,755.

New Automotive Irons Listed In Gray Iron Founders' Summary

Cleveland — Two specifications for new automotive irons 113 and 114 are listed in the revised summary of gray iron specifications issued recently by the Gray Iron Founders' Society.

The four-page bulletin contains a resume of the provisions of 14 separate sets of gray iron specifications, brake drum and clutch plate grades. An innovation is the specification of total carbon content as well as structure specifications. Previous automotive specifications listed only minimum strength and deflection properties.

Wage Drive to Counter GM Cut

Detroit — Stemming from discontent with the existent cost-of-living contract with the General Motors Corp., delegates of 100 local GM unions met recently to map out strategy for a wage increase drive. This action came in the wake of a 2¢ hourly wage reduction effected by GM on the grounds that living costs had dropped.

The newly-chartered International Union of Electrical Workers, CIO sent delegates to the meeting.

INDUSTRIAL SHORTS

WANTED — Commercial uses for a costly metal which will melt when held in the hand and has other unusual properties is wanted by the EAGLE-PICHER CO., Joplin, Mo. The metal, known as gallium, is a byproduct of the extraction of lead and zinc.

N. Y. CHAPTER — The New York Chapter of the AMERICAN MATERIALS HANDLING SOCIETY has recently been organized. The new chapter is the twelfth in this national organization, which now has over 1000 members.

ORGANIZES DISTRICT — A new apparatus sales district consisting of the St. Louis, Kansas City and Omaha territories has been established by GENERAL ELECTRIC CO., Schenectady. G. F. Maughmer, formerly Los Angeles sales office manager, will head the new organization with headquarters at St. Louis.

HOIST AGENTS — Whiting Corp., Harvey, Ill., manufacturers of electric hoists, has appointed WISNER, INC., Rockford, Ill., and NEFF EQUIPMENT CO., Toledo, as their distributors.

SPREADING OUT—Establishment of eight district offices has been announced by the DONOVAN WIRE & IRON CO., Toledo. They will be located in Ohio, Michigan, Indiana, Illinois, Wisconsin, Kentucky and adjoining states.

MOVES — Announcement has been made by the BRITISH IRON & STEEL CORP., LTD., that they have moved their New York office to 37 Wall St.

BUYS NEWTON GRINDER—The patents, sales and manufacturing rights for the Newton swing belt grinder has been purchased by VONNEGUT MOULDER CORP., Indianapolis, from the Newton Mfg. Co., Temple, Tex.

OPENS IN CHARLESTON—A new sales office in Charleston, W. Va., has been opened by RELIANCE ELECTRIC & ENGINEERING CO., Cleveland. William C. McConnell, a sales engineer in the Pittsburgh district for the past 2 years, is branch manager of the new office.

STRUCTURAL AWARD — Jones & Laughlin Steel Corp., Pittsburgh, has awarded a contract for approximately 15,000 tons of fabricated structural steel to AMERICAN BRIDGE CO., Pittsburgh, to be used for construction of an openhearth shop, a viaduct and some other units concerned with the expansion program at its Pittsburgh Works. Construction is scheduled for early summer.

HEADS GROUP — William J. Wolf, president, Wolf & Co., Hamilton, Ohio, and vice-president, David J. Joseph Co., Cincinnati, has been appointed chairman of the national affairs committee of the INSTITUTE OF SCRAP IRON & STEEL, INC.

NORTHWEST DEALER — Allis-Chalmers Mfg. Co., Milwaukee, has named the OLYMPIA SUPPLY CO., Roseburg, Ore., a dealer for their motors, controls, Texrope drive equipment and centrifugal pumps in Douglas and Curry Counties.

CHANGES NAME—Air Reduction Co., Inc., New York, has announced that the name of its Canadian subsidiary company, G. D. Peters & Co. of Canada Ltd., has been changed to AIR REDUCTION CANADA LTD.

YORK DISTRIBUTORS—YORK CORP., York, Pa., manufacturers of air conditioning and refrigeration equipment, has appointed the following new distributors: Calcasieu Lumber Co., Austin, Tex.; Clayton C. Smith Co., Williamsport, Pa.; Hawes Electric Co., Huntington, W. Va.; and Modernized Equipment Co., Cincinnati.

1949 Work Stoppages Cause Expense, Hour Loss, Report Says

Birmingham—Blame for the loss of 600,000 man hours to the Sloss-Sheffield Steel and Iron Co. and its employees in 1949 was cast at intermittent work stoppages in President C. S. Lawson's annual report to stockholders.

March 1949 signalled the start of such work stoppages as "the memorial period, the stabilizing period, three day weeks, and no day weeks," declared Mr. Lawson, adding that they had contributed to the loss of production and expensive operations.

He advised that several millions of dollars should be earmarked for plant modernization within the next 2 or 3 years and said that gross additions to the property account in 1949 amounted to $1,065,017, including the cost for construction in progress.

Tincher Products Co. Sold

Sycamore, Ill.—The entire assets of the Tincher Products Co., Chicago manufacturer for sealing porosity in castings, have been bought by Ideal Industries, Inc. The Tincher Products Co. will continue to operate under its name but will be a wholly-owned subsidiary.

Expansion plans call for the establishment of sales, engineering and service representation in at least seven strategic foundry areas. The Chicago area will be served from the factory at nearby Sycamore.

New England Council to Meet

Boston — Methods of financing industrial growth and the impact of federal policies on New England will be among the topics to be discussed at the 98th quarterly meeting of the New England Council, to be held on Friday, Mar. 24, in the Sheraton-Biltmore, Providence. Held with the cooperation of the Providence Chamber of Commerce, the meeting will be attended by business leaders of six New England States.

Same High Sales Level Seen For General Pipe Products Line

Pittsburgh — The maintenance of the present high level of sales in the general pipe products line through the summer of 1950 despite the market-sapping effect of excess supplies of foreign and domestic oil on oil-field equipment and supply sales, was forecast by A. E. Walker, president of the National Supply Co.

Included in the company's 1950 annual report, Mr. Walker's statement charged that foreign business was being retarded by the devaluation of foreign currencies and the dearth of American dollars to purchase American equipment.

Sales for 1949 were $130,885,882, as compared with the 1949 figure of $160,100,318. A decline of $6,566,771 from 1948 was shown in the net income listing of $5,660,591.

The rehabilitation and modernization program of the company, launched in the post-war period and nearing completion, will cost $25.3 million by the end of this year.

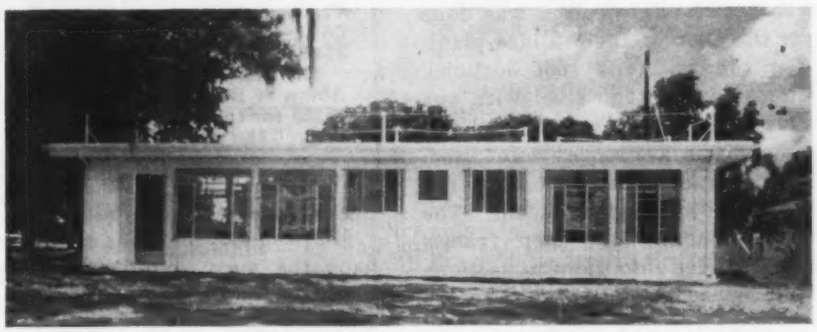
The steel strike closed the company's pipe mills for eight weeks, beginning Oct. 1. At the Ambridge, Pa., plant, the production loss was set as approximately 50,000 tons of seamless pipe, and at the Etna, Pa., plant, 36,000 tons of welded pipe and conduit.

Armco Corp. Subsidiary To Build $250,000 Culvert Plant

Middletown, Ohio — Armco Drainage & Metal Products, Inc., an Armco Steel Corp. subsidiary, will build a new $250,000 culvert manufacturing plant on a 20-acre site at Washington Court House, Ohio, according to an announcement by S. R. Ives, president of the Armco subsidiary.

The new plant is being constructed because the growing demand for culverts has already exceeded the capacity of the nearest Armco Drainage & Metal Products plant at Middletown. Washington Court House was selected because of its central location.

Construction will be started as soon as contracts can be let. The plant building will cover over 26,000 sq ft of floor space. It will be fully equipped to make corrugated metal pipe for draining highways, railroads and airports, and for making corrugated pipe arches. Equipment will also be provided for coating and paving culverts.



LITTLE STEEL HOUSE: This is the steel house that William D. Kennedy built in Pine Castle, near Orlando, Fla., for $4,000.

Ford Executive Builds Steel House

Employed metalworking facilities that can be found in hundreds of small towns . . . Roof and wall sections made of 16-gauge strip steel . . . Insulated with mastic compound.

Pittsburgh — William D. Kennedy has built himself a steel house. He is happy with it. He thinks it has great possibilities for mass production. But at the same time he is making no claims that it is the long-sought answer to the steel house problem.

What pleases Mr. Kennedy is that he built the house with the assistance of his wife, an architect friend, a Neon sign manufacturer and a specialist in mastic compounds. No elaborate production setup; no multimillion dollar pre-fabrication plant and equipment—just metalworking facilities that can be found in hundreds of towns throughout the country.

House Cost $4000 to Build

In building his steel house Mr. Kennedy tried to apply the same production techniques that reduced the price of the American automobile to within reach of nearly every pocketbook. Which is not unexpected, since he is manager of the Publications Dept. of the Ford Motor Co., Dearborn, Mich.

The Kennedy house is in Pine Castle, near Orlando, Fla. It is an L-shaped structure (see picture) and not too big—just 600 ft square. It has: (1) a bedroom which can be cut in two by an accordion-type folding partition; (2) living room; (3) kitchen (separated from the living area by an L-shaped bar counter, and (4) bath. It cost the Kennedys $4,000 to build, and they feel sure they can do it cheaper the next time. When it was finished they liked it so well they invested a couple of thousand dollars more on refinements.

This is Mr. Kennedy's story of his steel house:

With little more than an idea, plus some suggestions from Henderson Barr, associate and chief

designer of the architectural firm of Saarinen & Saarinen, they sat down to plan the house. Mrs. Kennedy made the detailed drawings (and later she supervised the job, since Mr. Kennedy could spend only a limited time in Florida).

They next interested Bill Wallace, owner of a local Neon sign company, who agreed to serve as contractor. Fabrication was done on the floor of the Wallace plant. For the wall and roof sections, strips of 16-gauge steel with one side bent into a tongue and the other into a groove were used. The tongues were slipped into the grooves and spot-welded. The steel window and door frames were welded into the wall sections and moved from the plant to the building site in a truck.

No Outside Paint Job

As it stood, the house was nothing but a steel box with windows in it, completely devoid of insulation against heat and cold. A sealer was needed for the joints. The Devine Brothers, Dwight and John, representatives of a mastic compound manufacturer, took care of these shortcomings with a tank full of the compound and a high-pressure spray gun.

The first outside coat of mastic was Gilsonite asphalt with a 75 pct filler of granulated cork, ⅜ in thick. Next came a coating of aluminum paint, then a sealer, and finally an outside coat of mastic containing mica and color pigment, obviating the need for outside paint.

While the ⅜ in. coating of mastic cuts heat loss of sheet steel about 72 pct, or less than hollow walls stuffed with rock wool, the Kennedys feel that their house is about as well insulated as most of the 10-odd houses they lived in during the war.

Features Aid Insulation

That's it, in its fundamentals, although there are other features designed to improve insulation, such as the solar-type roof with a 24 in. overhang all around, made up of seven layers, including two of steel and three of mastic, and the coat of insulating mastic on the exposed inside walls.

Mr. Kennedy believes that perhaps the most significant single feature of his house "is the proof it offers that metal pre-fabrication of small homes need not be dependent on large capital investment and nationwide operation." He feels that the pre-fabricating could be done by the small local metal working plant, even the sign shop and garage.

Competitive Bidding

The city of Boston had a problem recently. They needed someone to handle the job of dismantling and disposing of an abandoned steam pump at Calf Pasture, Dorchester.

The city opened the job to bidding and sat back to wait results.

Three replies were received. The first firm wanted $15,000 to do the job and the second asked $14,885.

The third, Shaughnessy & Ahern of Boston, offered to pay $5225 for the job. They received a check the next day.

Ford to Start Building Service Parts Depot Soon

Detroit—Construction will soon begin on the Ford Motor Co.'s central service parts depot, covering almost a million sq ft at Plymouth and Middlebelt Roads. Aug. 1 completion is planned.

The proposed structure will also contain the central region and Dearborn district sales offices. Material handling equipment of the service parts depot will be of the latest design. Loading space for 12 freight cars and dock space for 31 trucks has been provided. The staff will consist of 1400.

Fire Guts Birmingham Plant

Birmingham—Flames gutted to almost complete ruin the DeBardeleben Coal Corp.'s central preparation plant, located near Birmingham, Ala., and crippled its coal processing capacity of 60 train cars daily. The corporation's miners are members of the United Mine Workers of America and the mines were shut down during the recent coal strike.

Westinghouse Report Shows Jet Engine Production Increase

Pittsburgh—A repercussion of the current armaments race is indicated in the Westinghouse Electric Corp.'s annual stockholders report that the company's 1949 jet engine production showed an increase of over 50 pct over 1948 and that progress is being made in developing a nuclear energy power plant for a Navy submarine.

A further increase in jet engine production is expected this year with the operation of a Kansas City, Mo., plant leased from the Navy. The report noted that the Atomic Power Division's new engineering and research building, located near Pittsburgh, will be completed by mid-year.

The manufacture and shipment in 1949 of electric generating equipment with a capacity of approximately 3 million kw established a new record, the report continued. Improvement in light sources during the year was also cited and the company claims that fluorescent lamps with a life expectancy 3 times that of pre-war lamps have been developed.

Technical creations of 1949 ranged from basic new materials to re-combinations of previous devices teamed for new tasks.

Kelsey-Hayes Wheel Co. Quits

Detroit — Operations of the Kelsey-Hayes Wheel Co. at Monroe, Mich., have been concluded.

Approximately 300 of a total of 500 employees have been released. About 200 workers are closing out the Monroe operations. Many of these workers, it is expected, will find employment with the Ford Motor Co. which has purchased this plant.

N. Y. State Labor Cases Decline

Albany—The 2790 mediation and arbitration labor cases in which the New York State Mediation Board acted during 1949 represented a 10 pct decline from the previous year. Mediation cases totaled 1058, arbitration, 1732.

General Electric Profits Overshadow Peak '48 Earinngs

Top year in company's 58 yr career betters '48 profit by $2.2 million

Schenectady, N. Y.—General Electric Co. underwent the most profitable year in its 58 year history during 1949. Last week's stockholders' report showed that '49 net income stood at $125,639,000, overshadowing 1948 which saw a net income of $123,835,000.

The $2.2 million advance was registered despite a total revenue drop of from $1,651.5 million in 1948 to $1,633.8 million in 1949. Responsible for the increase was the whittling away of operating expenses.

Share Earning Rises

Since the earning of each dollar of total revenue reached 7.7¢, the earning per share of common stock was $4.36. In 1948 per dollar earning was 7.5¢ for a $4.29 allowance per share.

On a weighted average basis, product prices at the close of 1949 were 5 pct lower than at the year's start. But despite this, 1949 customer sales of $1,613,564 were 1.2 pct lower than the record of $1,632,701 established in 1948. In both 1948 and '49, producers' goods accounted for about 65 pct and consumers' goods for about 35 pct of total sales.

Motor Wheel Shares Get 1¢ More

Detroit—The Motor Wheel Corp.'s 1949 net earnings were $3,461,186, necessitating a 1¢ increase in earnings per share of common stock over 1948. Earning per share is $4.09 as compared with $4.08 in 1948. A slight drop in 1949 sales were reported, $52,155,631 from $58,339,674 in 1948.

Johnston & Jennings Sold

Cleveland, Ohio—The Pettibone Mulliken Corp., of Chicago, has purchased the Johnston & Jennings Co., this city. All the manufacturing operations of the Cleveland company have been shifted to the plant of the parent company.

Lustron Workers Fired

Columbus, Ohio—Heads of the mighty and the small fell when court-appointed receiver for the Lustron Corp., Clyde M. Foraker, fired 300 employees, from the president, Carl G. Strandlund, to office personnel.

The mass dismissal stemmed from a court order of U. S. District Judge Mel G. Underwood, who said that further dismissals were planned. The current payroll has plunged from $156,037 a month to $70,723.

High Demand Causes Armco Subsidiary to Build New Plant

Middletown, Ohio—A new $250,000 culvert manufacturing plant will be constructed for Armco Drainage and Metal Products, Inc., a subsidiary of Armco Steel Corp., Middletown, Ohio, on a 20 acre site at Washington C. H., Ohio, according to S. R. Ives, president of the subsidiary.

The new plant, which will employ 50 men, is being built because the growing demand for culverts has already exceeded the capacity of Armco Drainage and Metals Products' plant at Middletown.

The plant, covering 26,000 sq ft of floor space, will be equipped to make corrugated metal pipe for drainage highways, railroads and airports. Equipment for coating and paving culverts will also be provided. Steel to manufacture corrugated culverts will be supplied by Armco Steel Corp.'s Middletown, Ohio, and Ashland, Ky., plants.

Ford Forms Fund Group

Detroit—The Ford Motor Co. Fund, a non-profit corporation concerned with the administration of the company's contributions to scientific, charitable, and educational organizations, has been organized in Dearborn. Company officials comprise the board of trustees: Henry Ford II, Ernest R. Breech, John R. Davis, Benson Ford, William T. Gossett, D. S. Harder, and T. O. Yntema.

Oliver Mining Co. Builds Experimental Taconite Plant

Operation will form basis for development of large scale plants.

Duluth, Minn.—The taconite program on the Mesabi iron ore range is getting underway. Construction of a new type agglomeration plant at Virginia, Minn., by the Oliver Mining Co., a U. S. Steel subsidiary, will begin before April 1. The plant will process Minnesota taconites and fine ores.

"This major experiment," announced R. T. Elstad, president of the subsidiary, "is one of the steps in a $17 to $20 million program to secure basic information before building permanent commercial taconite plants."

Agglomeration, according to Mr. Elstad, is one of the most difficult steps because the product must retain its properties under all kinds of weather conditions, including rain, freezing and thawing in the year round operation of taconite plants. It must be strong to withstand severe handling on the way to the furnaces and must have desirable physical properties to make furnace operation economical.

Completion This year

The new plant will be the first combination sintering and nodulizing plant on the Mesabi range. It will have the capacity to produce approximately 1 million tons per year of sinter and nodules. Completion is expected by the end of the year. The plant will be built for the Oliver Co. by the Arthur G. McKee Co., Cleveland.

Until taconites are available from the plant, fine ores and concentrates from many of Oliver's washing plants will be brought to the Virginia plant by rail. Agglomeration of fine particles, which are too small to be worked properly in the furnace, will be done here instead of at lower lake furnaces.

Oliver plans to operate the plant on a 24 hour daily schedule. The products will be the subject

of much testing to determine their handling and shipping qualities as well as their behavior in the blast furnace, Mr. Elstad states. The operation will furnish necessary information for larger production plants of this kind which may be developed in the future.

New Magnetic Separator Concentrates Low Grade Iron Ore

Pittsburgh — A new type magnetic separator for concentration of low grade iron ore is in operation in Minnesota.

Developed by Jeffrey Mfg. Co., Columbus, O., the new separator is producing ore nodules containing about 64 pct iron at the rate of 200,000 tons a year from magnetic taconite. Magnetic design assistance was provided by Westinghouse Electric Corp.

The separator is operating at the Aurora, Minn., plant of the Erie Mining Co.

According to Phelan McShane, consulting mining engineer for Westinghouse, the separator consists of a stainless steel drum which rotates around stationary magnets.

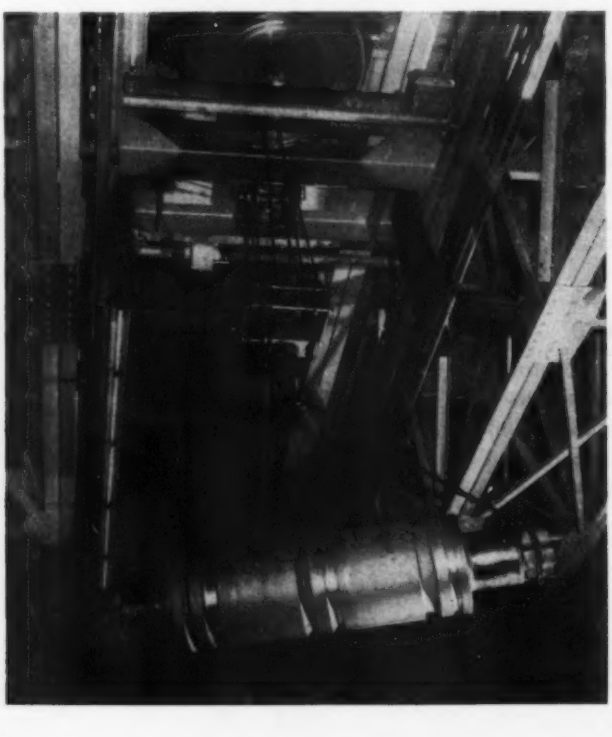
As the mixture in process passes beneath the rotating drum the magnets inside the drum attract the magnetic ore to it. The ore is carried through a washing zone and then away from the direct pull of the magnets, permitting the ore to drop into a trough leading to further grinding stages.

The taconite is ground in stages and passed through the new separator to eliminate barren rock from the system. Then, mixed with water, the finely ground material is passed through another type of Jeffrey magnetic separator for final separation of the iron mineral from the ore. After dewatering, the ore is processed into nodules.

New Bridge for Nova Scotia

Halifax, N. S.—Highways Minister Merrill D. Rawding stated that preliminary work on the construction of the new Strait of Canso bridge will be started within two months.

Estimates for the approaches will be prepared immediately and tenders will be called as soon as estimates are ready. The Nova Scotia government will spend $5,000,000 on the project.



ALUMINUM CRANE: Operating in the Aluminum Co. of Canada's new rod mill is a 15 ton crane fabricated entirely from aluminum. It is of riveted construction, was installed in 1948 and it is the first of its kind to be fabricated in Canada.

U.S. Removes Carbon Steel Products from Export Control

Washington — Effective as of Mar. 9, about 70 carbon steel products were removed from export controls. Included were ingots, blooms, billets, shapes, plates, sheets and other items.

At the same time, the Office of International Trade announced that iron and steel scrap export quotas for the first quarter would total 100,000 tons.

In another action, about 600 commodity classifications are to be placed under additional destination controls as of Mar. 20.

Excludes Western Hemisphere

The new destination controls will be put into operation by extending the present "R" country designation to all countries except the Western Hemisphere (North, South and Central America, Greenland and the Caribbeans). Heretofore, the designation applied only to the countries of Europe and adjacent areas.

It is estimated that this action by OIT will result in about a 3 pct increase in the amount of United States trade which is under export control. A complete description of the OIT actions above are to be found in Current Export Bulletin No. 567, dated Mar. 9, 1950.

Steel Founders' Society Starts Excess Metal Project

New York—To investigate and evaluate all known information on the removal of excess metal normally developed in the production of steel castings, the Steel Founders' Society of America has instituted a research project of three phases. It will seek complete comparative information based on operating experience, restudy established methods, and conduct an independent investigation of the field's latest developments.

The Society stated that it was aware of important advances made

in recent years but had initiated the project because of the limited scope of existing data on the varying methods of metal removal for gates, risers, feeding pads, fins and other minor protuberances.

Undertaken with the cooperation of a leading university engineering and research organization, experimental studies are being conducted in a selected steel foundry, reports F. Kermit Donaldson, the Society's executive vice president.

The project, under the leadership of Charles W. Briggs, technical and research director, is being accelerated by the cooperation of the industry. Individual experience records, information pools, and suggestions on design changes or new equipment are among the contributions of the member foundries.

Steelmen Welcome Proposed Lower Rail Rates

Proposed rate reductions on 80,000 lb carload shipments hailed as step in right direction . . . But steelmen want lower minimum and more products included.

Pittsburgh—The proposal of the Eastern railroads to charge lower rates on 80,000 lb carload shipments of iron and steel products is a welcome one to most steel producers, but it's only a step in the right direction.

That seems to sum up the sentiments of steel producers who stated their views to railroad executives at a public hearing here last Thursday. The feeling was that the railroads should take further steps if they want to recoup the bulk of the business lost to highway carriers in the last several years.

Find Fault With List

Fault was found with the list of iron and steel articles that would be carried at the lower rate on 80,000 lb shipments. The roads were asked to add to the list such articles as nails, staples, wire and barbed wire, bolts, nuts, rivets, steel fence posts, track spikes, welding rods, plates, pipe fittings and castings and forgings. As it now stands, the list includes flat-rolled products, bars and pipe 6-in. in diam or less.

Also mentioned was the fact that semi-finished steel was not included in the list. This, steel men pointed out, would mean that finished steel would be moving for less than semi-finished.

After the day-long hearing, the railroad officials took the recommendations of the shippers under consideration and will incorporate such changes as they deem advisable in the proposal they submit to the Interstate Commerce Commission.

Truck Shipments Cited

Several pipe producers expressed dissatisfaction with the limitation excluding pipe above 6-in. in diam from the 80,000 lb rate. Youngstown Sheet & Tube and Bethlehem Steel Co. were among mills asking that larger pipe be given the low rate, since the bigger tubes can be loaded to the 80,000 lb weight minimum as easily as can the smaller ones.

The railroads' proposal is frankly a move to recover business lost to truckers, whose competition has been particularly effective on hauls of 300 miles or less.

One company told the railroad men that shipments of nails, staples and wire in February moved 40 pct by truck, a 253 pct increase over February 1949 and a 100 pct boost over December 1949. It is estimated that generally shipments by truck have increased 26 pct in the last two years.

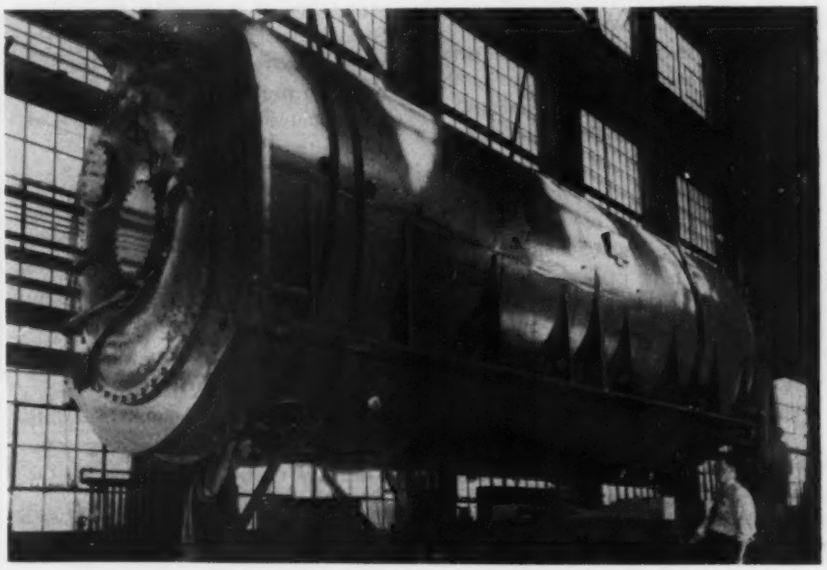
Other recommendations by producers included a proposal that the railroads consider reducing the minimum weight to 60,000 lb, or even lower.

Heater Assn. Elects Officers

New York—At the twenty-fourth annual meeting of the Industrial Unit Heater Assn. held in New York on Feb. 16, J. C. Patterson was elected president, H. S. Wheller, vice president, and L. O. Monroe, secretary-treasurer.

Mr. Patterson is industrial heating sales director for the Carrier Corp. and Mr. Wheller is president of the Wing Mfg. Co.

SHIPMENT: One of the heaviest shipments in Allis-Chalmers' history is this 375,000 lb. stator for a 125,000 kva Allis-Chalmers turbine generator for a large midwestern utility being loaded on a special high-capacity flat car.



Viewing the News from

The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

"A Victory for No One"

THE boys have returned to the pits. Their wives and families are happy in the knowledge that the breadwinner is once more earning good wages. The mine owners are relieved by the end of an ordeal. The members of the Administration are elated over the "success" of the Truman tactics. The general public is glad to see John L. move out of the headlines. The end of any crisis is always welcome.

Yet it would be a grave mistake to assume that anyone has won this strike or that any problems have been settled. The high command of the United Mine Workers may celebrate a victory. This ignores the fact that the strike will become a political issue. It proved beyond any possible doubt that a powerful national union, controlling a vitally necessary commodity, holds the welfare of the nation in the palm of its hand.

The miners cannot afford any extravagant huzzas over their "gains." These have been dearly purchased. Depending on the premises, it can be demonstrated that the increase won in wages will require from 5 to 10 years of steady work to compensate for the losses due to deliberate stoppages since last May.

The miners must also know by this time that every increase in the price of coal, every interruption in the regular supply drives customers to competitive fuels. The consumers of coal are buyers of mining labor. Every ton of coal displaced by higher prices or failure of a dependable supply means a cut in employment.

There can be little room for satisfaction in the thinking of the mine owners. The attractive growth potential of the industry has become the victim of chronic warfare between union and management. The hope of a 2½ year stable era in labor relations rests upon an obvious illusion. Under the terms of the settlement John L. may reopen negotiations on Apr. 1, 1951. To assume that he will fail to do this assumes a restraint on the part of John for which his long record of belligerence and hard bargaining offers not the slightest encouragement.

Least entitled to preen itself on the coal settlement is the Administration. A two-thirds majority of both Houses approved the Taft-Hartley Act, over the veto of the White House, in spite of incandescent pressure from labor. In open disregard of party discipline, large numbers of otherwise good Democrats in both Houses voted to place this legislation on the statute books. It was at that time considered the best practical solution of a stubborn, dangerous problem.

The President has seen fit repeatedly to challenge the wisdom, the justice and the efficacy of this law. Under these circumstances the coal miners could hardly be expected to accord the measure any degree of respect.

When it finally became necessary for Mr. Truman to invoke the odious statute, his Department of Justice dragged its feet and bungled the case. A thoroughly disciplined union, whose members dutifully sneezed every time John had a cold, suddenly disregarded the instructions of a dictatorial leader. Spontaneously and unanimously they refused to return to work. On the evidence presented, a Federal judge could not find the union guilty of bad faith.

The government has forfeited the only weapon capable of restraining labor. It has preferred impotence to performance. It has raised the white flag of submission and indicated to every other ruthless labor leader the techaique by which the law of the land may be nullified.

The strike has left no one the victor, neither the miner, the consumer of coal, the mine owner, the government, nor the public.

Elliott Co. Receives Large Order from French Steel Firm

New York—One of the largest electrical equipment orders ever placed in this country by the French steel industry is being completed by the Elliott Co. of Jeanette, Pa., at their Crocker-Wheeler Div., Ampere, N. J. The equipment will drive what will be the fastest merchant bar and rod mill in Western Europe at the Homecourt Works of the Companie des Forges et Acieres de la Marine et d'Homecourt.

Control equipment is being furnished by the Clark Controller Co.

The Homecourt Works are in the Orne Valley a few miles from Breiy, center of the iron ore basin of Lorraine. This plant is completely integrated. It includes a power plant, mine, coke ovens, blast-furnaces, open-hearth furnaces, basic bessemer converters, slabbing and blooming mills, continuous billet and sheet bar mills, plate mills and a universal mill in addition to the many other functions of a mill this size.

The new rod mill, being erected at a cost of $5.5 million, will have an annual production of approximately 160,000 tons.

More Steel Shipped To Automotive Industry in 1949

New York—More steel than ever before went to the automotive, oil and gas, and farm equipment industries last year, despite a decline in total steel shipments, the American Iron and Steel Inst. announced recently. Total steel shipments during 1949 were 58,104,000 tons, nearly 7,870,000 less than the amount shipped in 1948.

Automotive manufacturers took nearly 700,000 tons more last year than in 1948. Shipments to this industry were 18.8 pct of the total steel shipments. The oil and gas industry, for drilling, pipe lines, refineries and similar uses took nearly 4.5 million tons last year as compared with approximately 4.3 in 1948. Manufacturers of agricultural equipment received 1,468,000 tons or 2.3 pct of the

total, both figures being slightly higher than in previous years.

Among industries taking smaller tonnages as well as percentages of steel in 1949 than in 1948 were railroad transportation, machinery, electrical equipment, appliances and utensils. As a result of curtailed demand by railroads and their suppliers, the industry declined from fifth to sixth place as a buyer of steel.

The reason for the decline in total steel shipments was mainly due to the steel strike last autumn, since shipments in the first nine months of 1949 were almost identical with those of 1948.

U. S.-Venezuela Trade Profits Both Nations

Venezuela is our second best cash customer . . . Annual trade averages $1 billion . . . Automotive assembly plant being built in Caracas—*By GENE BEAUDET*

New York—A unique group of foreign business men arrived here last week. They didn't want to borrow anything. They didn't want to buy something for nothing. They believe in buying American goods for cash on the barrelhead. They want to sell us their goods at a fair price.

The group is the Venezuelan Trade Commission. Its members are leaders in the financial and industrial life of Venezuela, who are touring major American manufacturing centers this month to illustrate the advantages of continuing good trade relations between the two nations.

Has Free Flow of Dollars

Venezuela, the commission pointed out, is one of the few countries left in the world with a free flow of U. S. dollars. Its annual trade with the United States averages more than $1 billion. As Uncle Sam's best customer in Latin America, Venezuela is exceeded elsewhere only by Canada, Britain and Germany. It is our second best cash customer.

Last year Venezuela purchased over $½ billion worth of American goods. Of this amount $90 million went for machinery and vehicles and $200 million for metals and metal products.

Venezuela maintains a slightly unfavorable balance of trade with the U. S. but is still able to make these heavy purchases because of its favorable position with other nations who usually pay for Venezuelan goods with American dollars.

Eugenior Mendoza, leader of the group, declared that any attempt to upset this situation, such as altering the present arrangements whereby Venezuela exports heavy quantities of fuel oil to this country, would be a serious setback to the economy of both nations. Venezuela also ships iron ore and cocoa to this country.

Situation Good for Business

Alfred T. Phelps another member of the committee stated that Bethlehem Steel Corp. will begin shipping iron ore from its large concession at El Poa to the U. S. in about three months.

This situation is all to the good for American business. It is good for Venezuela too. Its continuance is a way of bringing Point Four into realization. The trade commission is attempting to acquaint the American public with these facts.

American business has found the Venezuelan climate a healthy one for them. American capital enjoys the same privileges as domestic, and the rate of return is high because of the wealth of natural resources. Many favorable factors to business exist such as the absence of currency control, free entry and withdrawal of capital and stability of foreign control. Venezuela is on the gold standard, Mr. Mendoza said, and is sticking to it.

But Venezuela is not standing by and letting other countries develop their industries for them. They are anxious to expand and develop their own. The atmosphere of free economy makes this possible.

Assembly Plant Being Built

An example of Venezuela's attempt to develop its own industries is found in the formation of a company to assemble automotive vehicles in Caracas.

The company will assemble all Chrysler products. A plant covering about 170,000 sq ft of floor space is being constructed by the Frederick Snare Co. of New York and assembly operations are to start in September.

The company is called Ensamblaje Venezolana. Major stockholders are John P. and Alfred T. Phelps, Venezuelan industrialists who are touring with the commission. The rest of the stock is owned by Chrysler distributors in Venezuela, in proportion to their annual sales volume.

U. S. Machinery Ordered

General plant manager will be Harlan E. Mills, former Central and South American sales manager for Chrysler. Other than Mr. Mills and about three other Americans on top management level the plant will be run exclusively by Venezuelans.

Present production estimates call for assembly of 4800 units per year, most of which will be automobiles for the domestic market. The firm

"Quit squawking, you'll get your construction set back as soon as we get our new crane."

hopes to assemble truck bodies and vans in the future. They will buy completely knocked-down sheet metal parts from Chrysler in the U. S. These parts will be cleaned, welded, primed, painted and assembled in the plant. The only assembled units that will be bought are motors and transmissions.

One quarter of a million dollars worth of machinery including conveyers, paint spray booths, cranes and hand tools are on order in the U. S. for use in the plant.

The firm aims eventually to assemble 30,000 units per year. They hope to export some of the vehicles to Columbia, the Netherlands East Indies and other countries in South America.

Jan. Building Contracts Rise

New York—Contracts totaling $779,530,000 were awarded for building and heavy engineering works in the 37 states east of the Rocky Mountains last month. These statistics released by the F. W. Dodge Corp. show an increase of 7 pct over last January. All construction classifications increased in January over the preceding month. Only heavy construction fell behind this month compared with February, 1949.

Residential contract awards for the area were 5 pct above January of this year and 87 pct better than February, 1949. Residential projects amounted to $361,452,000 this month, of which $34,341,000 was private building and $19,111,000 public building.

Enlarge Hydroelectric Plant

Vancouver, B. C.—B. C. Electric Co. plans to modernize and enlarge its No. 1 hydroelectric plant at Lake Buntzen at a cost of $3,500,000.

The contract for a 72,000 hp turbine to cost $500,000 has been awarded to the Vancouver Engineering Works. Work on the enlargement will start in May.

Construction Steel News

Fabricated steel awards this week included the following:

15,000 Tons, Construction of open hearth shop and viaduct by Jones & Laughlin Steel Corp., Pittsburgh, to American Bridge Co.

1600 Tons, Montgomery County, Pa., Valley Forge Expressway, schedule 2, State Highway & Bridge Authority, general contract to Frank A. Canuso, Philadelphia.

1100 Tons, Montgomery County, Pa., Valley Forge Expressway, schedule 1, State Highway & Bridge Authority, general contract to James D. Morrissey, Philadelphia.

975 Tons, Bronx, N. Y., Eight story apartment house, Sedwick and Normon Avenues, to Grand Iron Works.

675 Tons, Winona, Minn., Mississippi Valley Public Service Co. powerhouse, to American Bridge Co.

550 Tons, Johnstown, Pa., hospital, general contract to Berkbile Bros., Johnstown, Pa.

300 Tons, Newton and Brookline, Mass., new store building for various concerns on Worcester Turnpike through A. Kaplan, Boston, to West End Iron Works, Cambridge, Mass.

200 Tons, Ogdensburg, N. Y., St. Mary's Catholic Church, general contract to Walsh Bros., Cambridge, Mass.

175 Tons, Detroit, Ore., traveling crane for Detroit powerhouse, to Star Iron & Steel Co., Tacoma, Wash.

Fabricated steel inquiries this week included the following:

1754 Tons, Waltham and Weston, Mass., bituminous concrete, bituminous macadam, tar treated gravel and 12 bridges. F. D. Sabin, Cambridge, district engineer. Completion date June 30, 1951.

655 Tons, Reading and Wakefield, Mass., bituminous concrete and bituminous macadam and five bridges, Route 12, F. D. Sabin, Cambridge, district engineer. Completion date June 30, 1951.

208 Tons, Berkeley, Mass., bituminous concrete pavement and two four-span steel stringer bridges and approaches. Six sections of state highway on new locations. Frank A. Chase, Taunton, district engineer. Completion date, Oct. 15, 1950.

180 Tons, Del Norte Co., Calif., bridge over Rowdy Creek, near Winton Corners, California Div. of Highways, Sacramento, bids to Apr. 5.

155 Tons, Warren County, N. J., Alpha Underpass, New Jersey Dept. of Highways, due Mar. 30.

Reinforcing bar awards this week included the following:

1320 Tons, Lexington, Burlington and Waltham, Mass., limited access state highway, bituminous concrete surfacing and bridges. Savin Construction Co., East Hartford, Conn., low bidder.

1015 Tons, Huron, Ohio, Eastern States Farm Exchange Grain Elevators, to Truscon Steel Co., Youngstown, Ohio.

600 Tons, Philadelphia, Southwest main gravity sewer, to Joseph Lombardi & Sons, Philadelphia.

527 Tons, Los Angeles, overcrossing, Hollywood Freeway at Hill St., through Spencer Webb Co., to Bethlehem Pacific Coast Steel Co.

425 Tons, Montgomery County, Pa., Valley Forge Expressway, schedule 1, State Highway & Bridge Authority, general contract to James D. Morrissey, Philadelphia.

250 Tons, Montgomery County, Pa., Valley Forge Expressway, schedule 2, State Highway & Bridge Authority, general contract to Frank A. Canuso, Philadelphia.

250 Tons, Plymouth, Mass., bituminous macadam and bituminous concrete with two span concrete rigid frame and single span concrete rigid frame bridge and twin concrete box culvert. Lewis R. Sellow, Middleboro district engineer. Completion date Oct. 28, 1950. Thomas Brothers, Middleboro, low bidder.

200 Tons, Pennsylvania Dept. of Highways, Route 769(1-3), to S. J. Groves & Son, Downingtown, Pa.

195 Tons, Ames, Iowa, Agronomy Building at Iowa State, contract bought from Jos. T. Ryerson and Son, by Olson Construction Co.

180 Tons, Evanston, Ill., Cadillac garage, to Ceco Steel Products Co., Chicago.

150 Tons, Cleveland, Standard Oil Co. building, to Builders Structural Steel Co., Cleveland.

106 Tons, Derby, Conn., 36-foot span rolled beam bridge on Shelton Derby Ansonia Expressway over New Haven RR tracks.

Reinforcing bar inquiries this week included the following:

370 Tons, Chicago, Chippewa apartment building.

335 Tons, Chicago, Masonic Hospital addition.

330 Tons, Chicago, Section B, Terminal Building, O'Hare Field, Great Lakes Construction Co., Contractor.

290 Tons, Melrose Park, Ill., intercepting sewer.

200 Tons, St. Paul, Minn., junior high school building, bids due Mar. 28.

195 Tons, Chicago, W. C. Ritchie Co., Building No. 4, Charles B. Johnson and Co., Contractor.

165 Tons, Chicago, grade separation, Thomas McQueen Co., low bidder.

150 Tons, Duluth, Minn., Lincoln School, bids due April 5.

125 Tons, Lycoming County, Pa., earth dam and impounding reservoir, Williamsport Municipal Water Authority, due Mar. 21.

120 Tons, Oak Park, Ill., infirmary recreation bldg.

116 Tons, Berkeley, Mass., bituminous concrete pavement and two four-span steel stringer bridges and approaches. Six sections of state highway on new locations. Frank A. Chase, Taunton, district engineer. Completion date Oct. 15, 1950.

112 Tons, Winchester, Mass., Winchester Hospital, through Daniel Cunningham Construction Co. to Joseph T. Ryerson and Sons, Inc., Cambridge, Mass.

105 Tons, Chicago, South Side intercepting sewer and Racine Street Pumping Station.

100 Tons, East Boston, Mass., paving runway for East Boston Airport through M. DeMatteo Construction Co., Quincy, Mass., to Joseph T. Ryerson and Sons, Inc., Cambridge, Mass.

Railroad awards this week included the following:

16,500 Tons, to Tennessee Coal, Iron & Railroad Co. by Florida East Coast Railway.

1000 Tons, to Bethlehem Steel Co., by Florida East Coast Railway.

Steel sheet piling inquiries this week included the following:

308 Tons, New Haven, Conn., protection for intercepter sewer on U. S. Route 1.

January Record of 25 Years Shattered by 1950 Production

Detroit—Geared to a near-peak production pace, the automobile industry's assembly lines acted like a horn-of-plenty as vehicles flowed to retail outlets and made Jan. 1950 the highest production month ever.

Statistics compiled by this city's R. L. Polk & Co. indicated that January production will top 365,000 units, a jump of 80,000 over any previous January of the past quarter of a century. The record month surpasses by a good margin the 273,161 new car registration of Jan. 1949. Polk says that in Jan. 1950 47,983 trucks were registered.

Briefs and Bulletins

quick recovery—Pittsburgh district mills have done a good job of stepping up operations cut back as a result of the coal strike. Even a mill that was forced to shut down everything from coke making on up the line was melting steel several days after the miners returned to work. Some rolling mill start-ups were delayed several days for lack of coke oven gas. Power cutbacks to industrial consumers were still being felt by some electric furnace operators early last week.

no retreat—Highway carriers of iron and steel products ignored a proposed Eastern Railroads move to lower rates on 80,000 lb carload shipments by putting through a rate increase. They yielded an inch at a Cleveland meeting recently when they postponed the Mar. 15 effective date to May 1. Although the new truck rates will be 10 pct under the railroads' 40,000 lb rates, they will be higher than the proposed 80,000 lb rail rates.

plenty of takers—In the Detroit area there are plenty of takers for every form of steel that is available. Flat-rolled items and plates are all spoken for through the second quarter. Carbon bars are in about the same situation. Alloy bars are still a little easier, although they have been picking up, too. All suppliers tell about the same story; only the details are different.

strike blamed—The coal strike was the culprit that reduced February steel production to 6,782,448 tons of ingots and steel for castings, a decline of 14½ pct from January's 7,930,372 tons, charged the American Iron and Steel Institute. Furnaces were running at 88.9 pct capacity in February, as compared with 93.9 for January. In Feb. 1949, the furnaces were operated at 101.4 pct of capacity.

foreign imports grow—Foreign pig iron imports are growing in volume. An Eastern pipe foundry recently received 2500 tons of German iron and a deal is now in the making for 10,000 tons of Australian iron ore for an Ohio steel mill. Even Finnish iron is trying to wedge itself into the American market. Merchant furnace operators here are faced with the prospect of losing part of the domestic trade.

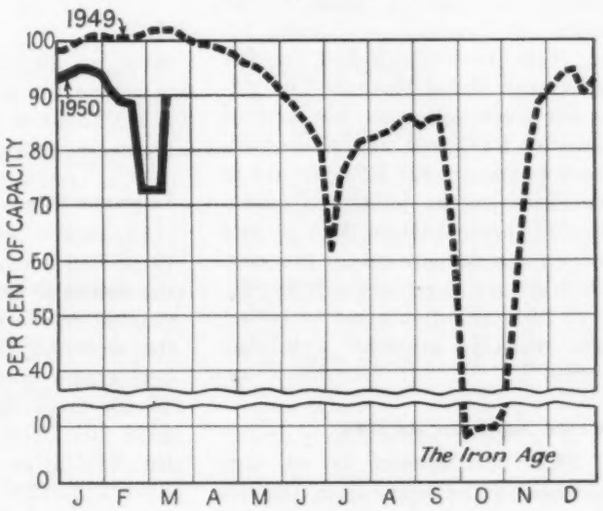
beehive ovens—With coal strike settlement assuring a steady supply, U. S. Steel Corp. will within a week bring into production 1400 beehive ovens in western Pennsylvania idle since July 1949 when the miners union started a 3-day week. Full oven operation will supply about 20 pct of the company's Pittsburgh district coke requirements.

grim sentiments—Striking molders of the Philadelphia-Camden foundries were back at their posts this week ending nine weeks of shutdown and loss of business. Some harassed foundrymen have said that they would never go through another strike again, preferring to go out of business.

plans auto plant—An auto plant near steel supply sources in the Pittsburgh district is contemplated by the Kaiser-Frazer Corp., revealed Edgar Kaiser, president. He added that it was uncertain whether a stamping or assembly plant would be included.

oil pump diesels—A $500,000 contract for oil pump gas-Diesel engines has been awarded to the Cooper-Bessemer Corp. by the Mid-Valley Pipe Line Co. The engines are intended for operations on Mid-Valley's 1000-mile pipeline from Longview, Tex., to Lima, Ohio.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
March 5	69.0*	84.5	61.5*	70.0	100.5*	98.5	89.5	43.0	103.0*	53.0	71.0	84.4	98.6	73.0
March 12	91.0	95.0	76.0	78.0	97.5	103.0	101.0	87.0	105.0	83.4	79.0	84.4	98.6	90.0

* Revised.

Nonferrous METALS OUTLOOK

Market Activities

by John Anthony

RFC withdraws from pricing tin . . . Bullish effect seen on market . . . Lead price drops 1¢ . . . Foreign metals offered several cents below domestic price.

New York—RFC has withdrawn all fixed price quotations for the sale of its tin as of Mar. 13. Longhorn Three Star tin and imported tin of Grade A quality will be sold by the agency on the basis of the weekly average of daily quotations for Grade A or Straits tin in New York published by the American Metal Market. The calendar week following the date of sale by RFC will apply. Preliminary payments for RFC tin are to be based on the published quotation for prompt Grade A or Straits tin on the day preceding the sale. Preliminary payments will be subject to later adjustment to reflect the weekly average published price.

Price Squeeze on RFC

This development is an outgrowth of the squeeze on the domestic tin sales program of RFC caused by the recent strength of the Singapore tin market. Prices rose last week on the Singapore market to the equivalent of about 75¢ New York. In the meantime, RFC continued to offer its tin at 74½¢, taking practically all business away from the private importers and traders. The RFC price of tin could not be raised to reflect the stronger world market without a storm of criticism from consumers.

Imports Drop Lead

In recent weeks the RFC tin price has acted as a ceiling over the domestic tin market. This also reacted on the world market. Over the weekend, the Singapore market came a cropper with a loss of £5 15s from its previous high of £576 10s. The discontinuance of the RFC price can be expected to have a bullish effect on the market, at least for the short term. The RFC price will no longer act as a ceiling over the domestic and world markets. Developments in the second session of the London Metal Exchange on Monday have already confirmed this. Trade factors expect the next session of the Singapore market to express the more bullish attitude on tin.

NONFERROUS METALS PRICES

	Mar. 8	Mar. 9	Mar. 10	Mar. 11	Mar. 13	Mar. 14
Copper, electro, Conn.	18.50	18.50	18.50	18.50	18.50	18.50
Copper, Lake, Conn.	18.625	18.625	18.625	18.625	18.625	18.625
Tin, Straits, New York	74.50	74.50	74.50	74.50	74.75	75.25
Zinc, East St. Louis	9.75	9.75	9.75	9.75	9.75	10.00
Lead, St. Louis	11.80	10.80	10.80	10.80	10.80	10.30

Note: Quotations are going prices.

The lead price dropped 1.00¢ per lb Mar. 9, reflecting the continued low volume of buying. Imports of foreign metal have been offered in this market for months at prices as much as several cents below the domestic price. Custom smelters who must buy concentrates and scrap as much as three months before the refined product can be sold as metal are required to protect against the possibility of a dropping market. Speculation in the trade revolves around the possibility of a repetition of a year ago when the initial drop in lead on Mar. 8 was followed by the waves of reductions in all nonferrous metals.

February statistics of the Copper Institute show a further reduction in domestic stocks of refined copper to 77,472 tons, down by 24,000 tons from January. Deliveries to customers during February were higher.

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in., and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 64¢; 11 to 13, 34.6¢ to 76¢; 23 to 25 36.7¢ to $1.05; 35 to 37, 44¢ to $1.53; 47 to 49, 63.5¢ to $2.20.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Rounds, 11S-T3, R317-T4; ⅛ to 11/32 in., 49¢ to 38¢; ⅜ to 1½ in., 37.5¢ to 35.5¢; 1 9/16 to 3 in., 35.5¢ to 32.5¢; 17S-T4 lower by 1¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.; 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 84¢; 75S-T-6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed)

Sheets and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher. Base: Up to ⅝ in. diam., 10,000 lb; ¾ in. to 1¾ in., 20,000 lb; 1⅞ in. and larger, 30,000 lb.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher. Base: Up to ⅝ in. diam, 10,000 lb; ¾ in. to 1¾ in., 20,000 lb; 1⅞ in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangle: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢ 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ lb to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam. in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ⅞ to 1, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and bars	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per lb, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	32.18	....	31.78
Copper, h-r	....	28.03	....
Copper, drawn	....	29.28	....
Low brass	30.13	29.81	33.03*
Yellow brass	28.69	28.38	31.70*
Red brass	30.60	30.29	33.51*
Naval brass	33.51	27.57	28.82
Leaded brass	....	23.19	27.22
Com'l bronze	31.61	31.30	34.27*
Manganese bronze	37.01	30.92	32.42
Phosphor bronze	50.90	51.15	....
Muntz metal	31.58	27.14	28.39
Everdur, Herculoy, Olympic, etc.	37.19	36.14	....
Nickel silver, 10 pct	39.66	41.87	46.80
Arch. bronze	....	....	27.22

*Seamless tubing.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	24.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	18.50
Copper, lake, Conn. Valley	18.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	10.30
Lead, New York	10.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, 100 to 5000 lb	36¢ to 38¢
Mercury, dollars per 76-lb flask f.o.b. New York	$70 to $73
Nickel, electro, f.o.b. New York	42.97
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$66 to $69
Silver, New York, cents per oz.	73.25
Tin, New York	75.25
Zinc, East St. Louis	10.00
Zinc, New York	10.72
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	16.75-18.25
No. 120	16.25-17.75
No. 123	15.75-17.25
80-10-10 ingot	
No. 305	21.75
No. 315	19.75
88-10-2 ingot	
No. 210	27.75
No. 215	25.25
No. 245	18.25-21.00
Yellow ingot	
No. 405	14.25-16.00
Manganese bronze	
No. 421	20.75

Aluminum Ingot

(Cents per lb, lot of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	18.50-19.00
0.60 copper, max.	18.25-18.75
Piston alloys (No. 122 type)	16.50-17.00
No. 12 alum. (No. 2 grade)	16.25-16.75
108 alloy	16.75-17.25
195 alloy	17.50-18.00
13 alloy	18.50-19.00
AXS-679	16.75-17.25

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	17.75-18.50
Grade 2—92-95%	16.75-17.50
Grade 3—90-92%	15.75-16.50
Grade 4—85-90%	15.25-15.75

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	35½
Electrodeposited	29¾
Rolled, oval, straight, delivered	33
Ball anodes	33¾
Brass, 80-20	
Cast, oval, 15 in. or longer	31¼
Zinc, oval, 99.886, f.o.b. Detroit	17¼
Ball anodes	16¼
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46½
Copper sulfate, 99.5 crystals, bbl	11.10
Nickel salts, single or double, 4-100 lb bags, frt allowed	18.00
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz lots, per oz.	59
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, 89 pct granular	11.00
Zinc cyanide, 100 lb drums	38.00

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	15½	14¾
Yellow brass	12½	11⅝
Red brass	14	13¼
Commercial bronze	14¼	13½
Manganese bronze	12	11¼
Leaded brass rod ends	12¼	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	15.25
No. 2 copper wire	14.25
Light copper	13.25
Refinery brass	13.50*
Radiators	9.75

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	15.25
No. 2 copper wire	14.25
Light copper	13.25
No. 1 composition	13.25
No. 1 comp. turnings	11.75
Rolled brass	10.50
Brass pipe	11.00
Radiators	10.00
Heavy yellow brass	9.75
Aluminum	
Mixed old cast	9.25- 9.50
Mixed old clips	9.25- 9.50
Mixed turnings, dry	7.00- 7.50
Pots and pans	9.25- 9.50
Low copper	11.50-12.00

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	13¾—14
No. 2 heavy copper and wire	12¾—13
Light copper	11½—11¾
Auto radiators (unsweated)	8½— 8¾
No. 1 composition	11 —11¼
No. 1 composition turnings	10½—10¾
Clean red car boxes	9 — 9¼
Cocks and faucets	9 — 9¼
Mixed heavy yellow brass	7¼— 7½
Old rolled brass	8½— 8¾
Brass pipe	9¼— 9½
New soft brass clippings	10½—11
Brass rod ends	9¾—10
No. 1 brass rod turnings	9½— 9¾
Aluminum	
Alum. pistons and struts	4½— 5
Aluminum crankcases	7 — 7½
2S aluminum clippings	10½—11
Old sheet and utensils	7 — 7½
Borings and turnings	4
Misc. cast aluminum	7 — 7½
Dural clips (24S)	7 — 7½
Zinc	
New zinc clippings	6½— 7
Old zinc	4 — 4½
Zinc routings	2½— 3
Old die cast scrap	3¼— 3½
Nickel and Monel	
Pure nickel clippings	21 —23
Clean nickel turnings	14 —15
Nickel anodes	20 —22
Nickel rod ends	20 —22
New Monel clippings	12 —14
Clean Monel turnings	8 — 9
Old sheet Monel	10 —12
Old Monel castings	9 —10
Inconel clippings	11 —13
Nickel silver clippings, mixed	8 —10
Nickel silver turnings, mixed	6 — 7
Lead	
Soft scrap, lead	8 — 8¼
Battery plates (dry)	3¾— 4
Magnesium	
Segregated solids	9 —10
Castings	5½— 6½
Miscellaneous	
Block tin	60 —62
No. 1 pewter	38 —40
No. 1 auto babbitt	35 —37
Mixed common babbitt	8 — 8¼
Solder joints	11 —11½
Siphon tops	40 —42
Small foundry type	10½—11
Monotype	9½—10
Lino. and stereotype	8¾— 9¼
Electrotype	7¼— 7½
New type shell cuttings	11½—11¾
Hand picked type shells	4 — 4¼
Lino. and stereo. dross	4¼— 4½
Electro. dross	2¼— 2½

MARKETS—PRICES—TRENDS

SCRAP
Iron & Steel

Demand Increases for Better Grades

No. 1 heavy melting steel was stronger in three major markets this week. The price in Pittsburgh for No. 1 heavy melting steel, which advanced $1.00 per ton last week, went up another 50¢ this week to a top of $32.50. In the Chicago area purchases of representative tonnages by one of the large consumers caused heavy melting prices to increase by $1.00 per ton over last week.

Scrap prices in Detroit area became much stronger, too. The demand is mostly concentrated on better grades. The Detroit price for No. 1 heavy melting steel went up $2.00 per ton with the top price at $24.00. One factor that is influencing the prices there is the loss of scrap that is usually produced by the strike-bound Chrysler plants. Chrysler plants usually generate about 50,000 tons of scrap per month. The monthly scrap loss may be estimated as high as 100,000 tons if Chrysler suppliers are taken into consideration.

Elsewhere prices have not changed considerably, except in New York where a definite demand for better grades is being felt. In Cleveland and the Valley, although prices remain the same, the market has a strong undertone and prices seem on the verge of an upturn.

PITTSBURGH—The market was bullish. Brokers were paying higher prices to fill outstanding orders and while the mills were not buying, the market was up 50¢ to $32.50. Scrap rails were up $1.00. Cast grades and malleable were stronger.

CHICAGO—Heavy melting prices advanced a dollar here on the basis of purchases by one of the area's large consumers, though mill buying in general is not heavy. Though outstanding orders are relatively substantial, shipments against the orders are not high, and despite the rising area operating rate, there is little evidence that mills will come into the market in a big way in the near future.

PHILADELPHIA — Prices continue to hold in this market at a very small volume of business. Last week there was further strengthening in the cast market and in low phos grades. The heavy supply of bundles accumulated in this market continue to govern steel grade transactions. The end of the local foundry strike is expected to influence cast grade prices. Heavy breakable out of the Navy Yard is reported to have brought $32.07. The market as a whole continues very dull, without any improvement in demand following the end of the coal strike. Low phos is quoted 50¢ higher; carwheels and malleable are $1.00 higher.

NEW YORK—There is a very definite demand for No. 1 heavy melting steel here this week as mills are getting back into operation and are stepping up their order rate on the better grades. No. 1 heavy melting advanced $1.00 to a top of $32.00 per ton. This price is pretty common here with orders piling up with brokers for it at this price. There is not too heavy a demand for the lesser grades although prices firmed up generally all down the line with some cast grades advancing $1.00 per ton.

DETROIT—With coal relief in sight and automobile schedules excepting Chrysler heading for an all-time peak, scrap prices have stiffened noticeably here. The market is definitely stronger, apparently supported by a demand for steel for conversion, the weather and the desire of most steel plants to use only the best grade materials. Another factor that is being felt here is the loss of an estimated 50,000 tons of scrap monthly by Chrysler alone and possibly as much as 100,000 tons if the overall effect of the strike on Chrysler and all of its suppliers is considered.

CLEVELAND—A strong but confused scrap market prevailed here and in the valley this week. Certain mills are out of the market and brokers are having difficulty coordinating the tonnage coming out with their releases. On the other hand, other brokers and dealers are being forced to pay more than quoted prices to cover certain orders from mills that bought a week or ten days ago. The market wants to go up. Good heavy material is in strong demand, and some orders for cast for the openhearth are still out, and all foundry grades are showing improvement. Blast furnace grades are hard to cover at quoted prices.

ST. LOUIS — No special interest was shown in the scrap iron market in the St. Louis industrial district during the week. Offerings were light, and there is a better sentiment in the trade, with the feeling that the mills will come into the market shortly. Shipments have been slow as a result of heavy rains, which have been followed by freezing weather.

BOSTON—The firm price undertone generally reported in other areas has not yet appeared here. Business, as one broker put it, is "flat as a pancake." Snow early this week has not helped activity either. Shoveling turnings were off 50¢ and machine shop turnings were down 25¢. While optimism was absent early this week there was a feeling that the pickup elsewhere might affect prices here.

BUFFALO — Cold weather and snow have slowed considerably the movement of scrap in this area. The stalemate in steel making grades continues but a quiet steady tone rules prices. Dealers report a reluctance to pay higher prices to attract additional supplies until they are assured that leading mill consumers are willing to do business.

CINCINNATI—Limited trading at quoted prices marked a strong undertone in the scrap market here. Demand for all grades has quieted down somewhat since last week, but brokers and dealers are bullish. Foundry grades are moving in small tonnages, and there is some movement of openhearth and blast furnace grades to other districts.

BIRMINGHAM—The price trend here for openhearth grades is stronger although mill buying is currently limited. During the past 10 days, blast furnace scrap was in such heavy demand that a new grade of one-ft heavy scrap was bought by a local blast furnace operator for $27 per gross ton.

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most things she buys cost more!

Our daily food items are produced by literally thousands of large and small businesses across the country. These producers all operate in highly competitive fields, although the prices of many are influenced by government controls. At *producing points* (before shipping, wholesale and retail handling), prices have been ranging about like this . . .

Sugar . . . . 8¢ a lb. (at refineries)
Milk . . . . 11¢ a qt. (at farm milk sheds)
Bread . . . . 13½¢ a lb. (at bakeries)
Pork . . . . 17¢ a lb. (at slaughter houses)
Beef . . . . 36¢ a lb. (at slaughter houses)
Butter . . . . 62¢ a lb. (at dairies)

Look, then . . . here's an amazing fact . . .
Steel is sold at an average price of less than 5¢ a pound, f.o.b. the mills, by the 247 different steel companies which make the steel products we depend upon in our daily living.
Think of it. Less than 5¢ a pound. That's how competition and the Steel Industry serve America's steel requirements.

AMERICAN IRON AND STEEL INSTITUTE • 350 FIFTH AVENUE, NEW YORK 1, N. Y.

Scrap IRON & STEEL Prices

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$32.00 to $32.50
No. 2 hvy. melting	29.00 to 29.50
No. 1 bundles	32.00 to 32.50
No. 2 bundles	23.50 to 24.00
Machine shop turn.	22.00 to 22.50
Mixed bor. and ms. turns.	22.00 to 22.50
Shoveling turnings	24.50 to 25.00
Cast iron borings	24.50 to 25.00
Low. phos. plate	33.50 to 34.00
Heavy turnings	27.00 to 28.00
No. 1 RR, hvy. melting	33.00 to 33.50
Scrap rails, random lgth	36.50 to 37.50
Rails 2 ft and under	39.00 to 40.00
RR. steel wheels	35.50 to 36.00
RR. spring steel	35.50 to 36.00
RR. couplers and knuckles	35.50 to 36.00
No. 1 machinery cast	39.00 to 40.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Malleable	35.00 to 36.00

Chicago

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 factory bundles	27.00 to 28.00
No. 1 dealers' bundles	25.00 to 26.50
No. 2 dealers' bundles	24.00 to 25.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	20.50 to 21.50
Cast iron borings	20.00 to 21.00
Low phos. forge crops	32.00 to 33.00
Low phos. plate	30.50 to 31.50
No. 1 RR. hvy. melting	29.00 to 30.00
Scrap rails, random lgth.	33.00 to 34.00
Rerolling rails	42.00 to 43.00
Rails 2 ft and under	39.00 to 40.00
Locomotive tires, cut	34.00 to 35.00
Cut bolsters & side frames	31.00 to 32.00
Angles and splice bars	35.00 to 36.00
RR. steel car axles	42.00 to 43.00
RR. couples and knuckles	32.00 to 33.00
No. 1 machinery cast.	39.00 to 40.00
No. 1 agricul. cast.	37.00 to 38.00
Heavy breakable cast.	30.00 to 31.00
RR. grate bars	29.00 to 30.00
Cast iron brake shoes	30.00 to 31.00
Cast iron car wheels	36.00 to 37.00
Malleable	38.00 to 39.00

Philadelphia

No. 1 hvy. melting	$22.50 to $23.50
No. 2 hvy. melting	20.50 to 21.50
No. 1 bundles	22.50 to 23.50
No. 2 bundles	17.50 to 18.50
Machine shop turn.	15.00 to 15.50
Mixed. bor. and turn.	14.00 to 14.50
Shoveling turnings	18.00 to 18.50
Low phos. punchings, plate	26.00 to 26.50
Low phos. 5 ft and under	25.00 to 25.50
Low phos. bundles	24.50 to 25.00
Hvy. axle forge turn.	22.50 to 23.50
Clean cast chem. borings	28.00 to 29.00
RR. steel wheels	28.00 to 29.00
RR. spring steel	28.00 to 29.00
Rails 18 in. and under	35.00 to 36.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	30.00 to 31.00
Heavy breakable cast.	33.00 to 34.00
Cast iron carwheels	36.00 to 37.00
Malleable	37.00 to 38.00

Cleveland

No. 1 hvy. melting	$28.00 to $28.50
No. 2 hvy. melting	25.50 to 26.00
No. 1 busheling	28.00 to 28.50
No. 1 bundles	28.00 to 28.50
No. 2 bundles	22.50 to 23.00
Machine shop turn.	18.50 to 19.00
Mixed bor. and turn.	20.50 to 21.00
Shoveling turnings	20.50 to 21.00
Cast iron borings	20.50 to 21.00
Low phos. 2 ft and under	29.00 to 29.50
Steel axle turn.	27.00 to 27.50
Drop forge flashings	28.00 to 28.50
No. 1 RR. hvy. melting	32.00 to 32.50
Rails 3 ft and under	42.00 to 43.00
Rails 18 in. and under	43.00 to 44.00
No. 1 machinery cast.	42.00 to 43.00
RR. cast.	42.00 to 43.00
RR. grate bars	30.00 to 31.00
Stove plate	34.00 to 35.00
Malleable	38.00 to 39.00

Youngstown

No. 1 hvy. melting	$31.50 to $32.00
No. 2 hvy. melting	27.50 to 28.00
No. 1 bundles	31.50 to 32.00
No. 2 bundles	$24.50 to $25.00
Machine shop turn.	21.00 to 21.50
Shoveling turnings	23.00 to 23.50
Cast iron borings	23.00 to 23.50
Low phos. plate	32.50 to 33.00

Buffalo

No. 1 hvy. melting	$27.50 to $28.00
No. 2 hvy. melting	25.50 to 26.00
No. 1 busheling	25.50 to 26.00
No. 1 bundles	26.50 to 27.00
No. 2 bundles	24.00 to 24.50
Machine shop turn.	18.00 to 18.50
Mixed bor. and turn.	19.00 to 19.50
Shoveling turnings	20.50 to 21.00
Cast iron borings	19.50 to 20.00
Low phos. plate	29.00 to 29.50
Scrap rails, random lgth.	33.50 to 34.00
Rails 2 ft and under	38.50 to 39.00
RR. steel wheels	33.00 to 33.50
RR. spring steel	33.00 to 33.50
RR. couplers and knuckles	33.00 to 33.50
No. 1 machinery cast.	35.00 to 36.00
No. 1 cupola cast.	30.50 to 31.50
Stove plate	30.00 to 31.00
Small indus. malleable	30.00 to 30.50

Birmingham

No. 1 hvy. melting	$24.00
No. 2 hvy. melting	22.00
No. 2 bundles	20.00
No. 1 busheling	23.00
Machine shop turn.	$16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00
Bar cross and plate	27.00 to 28.00
Structural and plate	27.00 to 28.00
No. 1 RR. hvy. melt.	26.00 to 27.00
Scrap rails, random lgth.	29.00 to 30.00
Rerolling rails	33.00 to 34.50
Rails 2 ft and under	35.50 to 36.00
Angles & splice bars	33.50 to 34.50
Std. steel axles	28.00 to 29.00
No. 1 cupola cast.	35.00 to 36.00
Stove plate	30.00 to 31.00
Cast iron carwheels	28.00 to 29.00

St. Louis

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 2 bundled sheets	24.00 to 25.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	18.00 to 19.00
Rails, random lengths	30.00 to 31.00
Rails 3 ft and under	35.00 to 36.00
Locomotive tires, uncut	27.00 to 28.00
Angles and splice bars	34.00 to 35.00
Std. steel car axles	40.00 to 42.00
RR. spring steel	30.00 to 31.00
No. 1 machinery cast.	37.00 to 38.00
Hvy. breakable cast.	31.00 to 32.00
Cast iron brake shoes	29.00 to 30.00
Stove plate	28.00 to 29.00
Cast iron car wheels	35.00 to 36.00
Malleable	32.00 to 33.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	17.50 to 18.00
No. 2 bundles	15.50 to 16.50
Machine shop turn	11.00 to 11.50
Mixed bor. and turn.	11.00 to 11.50
Shoveling turnings	13.00 to 13.50
Clean cast chem. bor.	23.00 to 24.00
No. 1 machinery cast.	28.00 to 29.00
Mixed yard cast.	26.00 to 26.50
Charging box cast.	26.00 to 27.00
Heavy breakable cast.	26.00 to 27.00
Unstrp. motor blocks	19.50 to 20.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$20.00 to $20.50
No. 2 hvy. melting	16.50 to 17.00
No. 1 bundles	20.00 to 20.50
No. 2 bundles	$15.00 to $15.50
Machine shop turn.	10.75 to 11.25
Mixed bor. and turn.	10.75 to 11.25
Shoveling turnings	13.00 to 13.50
No. 1 busheling	18.00 to 19.00
Clean cast chem. borings	18.00 to 18.50
No. 1 machinery cast.	25.50 to 26.50
No. 2 machinery cast.	22.00 to 23.00
Heavy breakable cast.	22.00 to 23.00
Stove plate	20.00 to 21.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	20.50 to 21.50
No. 1 bundles	25.00 to 26.00
New busheling	23.00 to 24.00
Flashings	23.00 to 24.00
Machine shop turn.	15.50 to 16.00
Mixed bor. and turn.	15.50 to 16.00
Shoveling turnings	17.00 to 17.50
Cast iron borings	17.00 to 17.50
Low phos. plate	25.00 to 26.00
No. 1 cupola cast.	33.00 to 34.00
Heavy breakable cast.	26.00 to 27.00
Stove plate	27.00 to 28.00
Automotive cast.	35.00 to 36.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$26.50 to $27.00
No. 2 hvy. melting	22.50 to 23.00
No. 1 bundles	26.50 to 27.00
No. 2 bundles	22.50 to 23.00
Machine shop turn.	14.50 to 15.00
Mixed bor. and turn.	15.50 to 16.00
Shoveling turnings	16.50 to 17.00
Cast iron borings	16.50 to 17.00
Low phos. 18 in. under	33.00 to 33.50
Rails, random lengths	34.00 to 34.50
Rails, 18 in. and under	42.00 to 43.00
No. 1 cupola cast	38.00 to 39.00
Hvy. breakable cast	33.00 to 34.00
Drop broken cast	42.00 to 43.00

San Francisco

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turn.	9.00
Elec. fur. 1 ft and under	28.00
No. 1 RR. hvy. melting	20.00
Scrap rails, random lgth.	20.00
No. 1 cupola cast.	$30.00 to 35.00

Los Angeles

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Mach. shop turn.	9.00
Elec. fur. 1 ft and under	30.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	$32.50 to 35.00

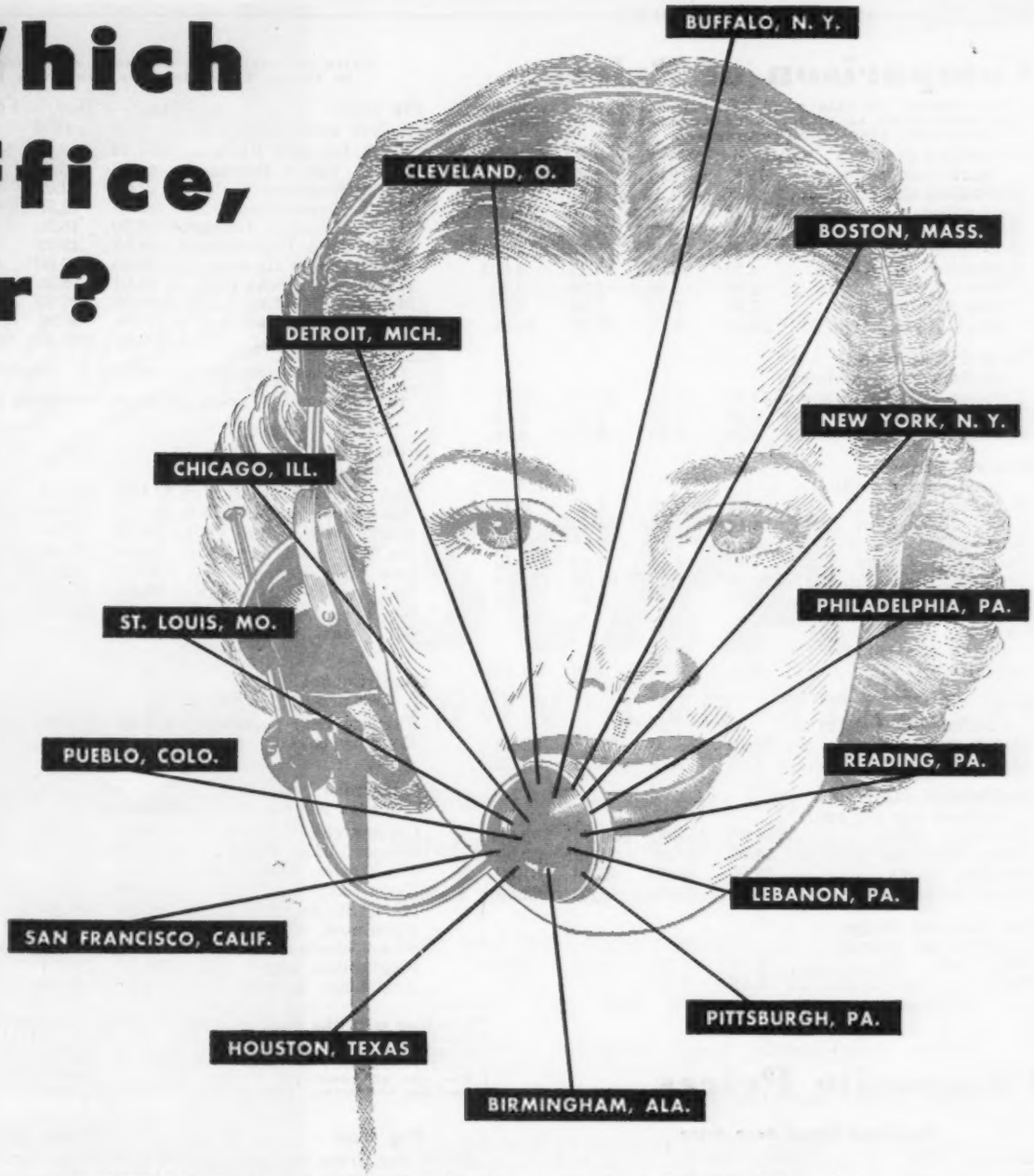
Seattle

No. 1 hvy. melting	$18.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Elec. fur. 1 ft and under	$25.00 to 28.00
RR. hvy. melting	19.00
No. 1 cupola cast.	30.00
Heavy breakable cast.	20.00

Hamilton, Ont.

No. 1 hvy. melting	$24.00
No. 1 bundles	16.00
No. 2 bundles	16.00
Mechanical bundles	22.00
Mixed steel scrap	20.00
Mixed bor. and turn.	18.00
Rails, remelting	24.00
Rails, rerolling	27.00
Bushelings	18.50
Bush., new fact, prep'd.	22.00
Bush., new fact, unprep'd.	17.00
Short steel turnings	18.00
Cast scrap	$40.00 to 43.00

Which office, sir?



Since 1889 Luria Brothers and Company, Inc. have pursued a policy of better service made possible by years of "know how" and personnel who have the desire to please.

The expansion of our organization, with offices located in 15 major cities, is in accordance with our policy to give better service to our customers.

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LURIA BROTHERS AND COMPANY, INC.

Main Office

LINCOLN-LIBERTY BLDG.
Philadelphia 7, Pennsylvania

Yards

LEBANON, PA. • READING, PA.
DETROIT (ECORSE), MICH.
MODENA, PA. • PITTSBURGH, PA.
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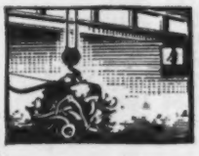

Branch Offices

BIRMINGHAM, ALA. Empire Bldg.
BOSTON, MASS. Statler Bldg.
BUFFALO, N.Y. Genesee Bldg.
CHICAGO, ILL. 100 W. Monroe St.
CLEVELAND, O. 1022 Midland Bldg.
DETROIT, MICH. 2011 Book Bldg.
HOUSTON, TEXAS 803-4-5 Milam Bldg.
LEBANON, PA. Luria Bldg.
NEW YORK, N.Y. Woolworth Bldg.
PITTSBURGH, PA. Oliver Bldg.
PUEBLO, COLO. 334 Colorado Bldg.
READING, PA. Luria Bldg.
ST. LOUIS, MO. 2110 Railway Exchange Bldg.
SAN FRANCISCO, CAL. Pacific Gas & Elec. Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Mar. 14, 1950	Mar. 7, 1950	Feb. 14, 1950	Mar. 15, 1949
Hot-rolled sheets	3.35	3.35	3.35	3.26
Cold-rolled sheets	4.10	4.10	4.10	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.265
Cold-rolled strip	4.21	4.21	4.21	4.063
Plates	3.50	3.50	3.50	3.42
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	33.25
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.75
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.70
Special coated mfg. ternes	6.50	6.50	6.50	6.65
Bars and Shapes: (cents per pound)				
Merchant bars	3.45	3.45	3.45	3.37
Cold-finished bars	4.145	4.145	4.145	3.995
Alloy bars	3.95	3.95	3.95	3.75
Structural shapes	3.40	3.40	3.40	3.25
Stainless bars (No. 302)	28.50	28.50	28.50	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.50	4.50	4.50	4.15
Rails: (dollars per 100 lb)				
Heavy rails	$3.40	$3.40	$3.40	$3.20
Light rails	3.75	3.75	3.75	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$54.00	$54.00	$54.00	$52.00
Slabs, rerolling	54.00	54.00	54.00	52.00
Forging billets	63.00	63.00	63.00	61.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	63.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	3.85	3.85	3.85	3.619
Skelp	3.15	3.15	3.15	3.25

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Mar. 14, 1950	Mar. 7, 1950	Feb. 14, 1950	Mar. 15, 1949
No. 2, foundry, Phila.	$50.42	$50.42	$50.42	$51.56
No. 2, Valley furnace	46.50	46.50	46.50	46.50
No. 2, Southern Cin'ti	49.08	49.08	49.08	49.46
No. 2, Birmingham	42.38	42.38	42.38	43.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	46.50
Basic del'd Philadelphia	49.92	49.92	49.92	50.76
Basic, Valley furnace	46.00	46.00	46.00	46.00
Malleable, Chicago†	46.50	46.50	46.50	46.50
Malleable, Valley	46.50	46.50	46.50	46.50
Charcoal, Chicago	68.56	68.56	68.56	73.78
Ferromanganese‡	173.40	173.40	173.40	168.60

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross tons)				
Heavy melt'g steel, P'gh.	$32.25	$31.75	$31.25	$36.75
Heavy melt'g steel, Phila.	23.00	23.00	23.00	35.50
Heavy melt'g steel, Ch'go	28.50	27.50	27.50	34.50
No. 1 hy. com. sh't, Det.	25.50	22.50	23.50	32.50
Low phos. Young'n	32.75	32.75	31.75	39.50
No. 1, cast, Pittsburgh	39.50	37.50	37.50	43.50
No. 1, cast, Philadelphia	35.50	35.50	35.50	40.00
No. 1, cast, Chicago	39.50	39.50	38.50	41.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.00	$14.00	$14.00	$15.25
Foundry coke, prompt	15.75	15.75	15.75	16.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	18.50	18.50	18.50	23.50
Copper, Lake Conn.	18.625	18.625	18.625	23.625
Tin Straits, New York	75.25	74.50	74.50	$1.03
Zinc, East St. Louis	10.00	9.75	9.75	17.50
Lead, St. Louis	*10.30*	11.80	11.80	17.80
Aluminum, virgin	17.00	17.00	17.00	17.00
Nickel electrolytic	42.97	42.97	42.97	42.93
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	24.50	24.50	27.25	38.50

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Mar. 14, 1950	3.837¢ per lb.	$46.38 per gross ton	$27.92 per gross ton
One week ago	3.837¢ per lb.	46.38 per gross ton	27.42 per gross ton
One month ago	3.837¢ per lb.	46.38 per gross ton	27.25 per gross ton
One year ago	3.754¢ per lb.	46.74 per gross ton	35.58 per gross ton

	High	Low
1950	3.837¢ Jan. 3	3.837¢ Jan. 3
1949	3.837¢ Dec. 27	3.705¢ May 3
1948	3.721¢ July 27	3.193¢ Jan. 1
1947	3.193¢ July 29	2.848¢ Jan. 1
1946	2.848¢ Dec. 31	2.464¢ Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1
1944	2.396¢	2.396¢
1943	2.396¢	2.396¢
1942	2.396¢	2.396¢
1941	2.396¢	2.396¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1932	1.89196¢ July 5	1.83910¢ Mar. 1
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

	High	Low
1950	$46.38 Feb. 7	$45.88 Jan. 3
1949	46.87 Jan. 18	45.88 Sept. 6
1948	46.91 Oct. 12	39.58 Jan. 6
1947	37.98 Dec. 30	30.14 Jan. 7
1946	30.14 Dec. 10	25.37 Jan. 1
1945	25.37 Oct. 23	23.61 Jan. 2
1944	$23.61	$23.61
1943	23.61	23.61
1942	23.61	23.61
1941	$23.61 Mar. 20	$23.45 Jan. 2
1940	23.45 Dec. 23	22.61 Jan. 2
1939	22.61 Sept. 19	20.61 Sept. 12
1938	23.25 June 21	19.61 July 6
1937	23.25 Mar. 9	20.25 Feb. 16
1936	19.74 Nov. 24	18.73 Aug. 11
1935	18.84 Nov. 5	17.83 May 14
1932	14.81 Jan. 5	13.56 Dec. 6
1929	18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1950	$27.92 Mar. 14	$26.25 Jan. 3
1949	43.00 Jan. 4	19.33 June 28
1948	43.16 July 27	39.75 Mar. 9
1947	42.58 Oct. 28	29.50 May 20
1946	31.17 Dec. 24	19.17 Jan. 1
1945	19.17 Jan. 2	18.92 May 22
1944	19.17 Jan. 11	15.76 Oct. 24
1943	$19.17	$19.17
1942	19.17	19.17
1941	$22.00 Jan. 7	$19.17 Apr. 10
1940	21.83 Dec. 30	16.04 Apr. 9
1939	22.50 Oct. 3	14.08 May 16
1938	15.00 Nov. 22	11.00 June 7
1937	21.92 Mar. 30	12.67 June 9
1936	17.75 Dec. 21	12.67 June 8
1935	13.42 Dec. 10	10.33 Apr. 29
1932	8.50 Jan. 12	6.43 July 5
1929	17.58 Jan. 29	14.08 Dec. 8

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

SCRAP

IRON AND STEEL

- Cast Iron
- Electric Furnace Grades
- Open Hearth
- Foundry Steel
- Sheet Iron for Baling
- Stainless Steel
- Non-Ferrous Metals

Since 1898 — for over fifty years — the Alter Company has served the scrap consumer as well as the scrap producing industries and the scrap dealers.

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IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$50.00 1													$50.00 31
Alloy, net ton	$51.00 1.17													$51.00 31
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$53.00 1	$53.00 1	$53.00 1				$57.00 13		$53.00 3	$58.00 26	$53.00 3			
Carbon forging billets, net ton	$63.00 1	$63.00 1.4	$63.00 1.8	$63.00 4			$63.00 25		$63.00 3.4	$65.00 26	$63.00 3			$63.00 31
Alloy, net ton	$66.00 1.17	$66.00 1.4	$66.00 1		$66.00 4.42		$66.00 13	$66.00 3	$66.00 3.4	$68.00 26	$66.00 3			$66.00 31
SHEET BARS							$57.00 13							
PIPE SKELP	3.15 1						3.15 1.4							
WIRE RODS	3.85 2.16	3.85 3.4.23	3.85 6	3.85 2			3.85 6				3.85 3	3.95 3		
SHEETS Hot-rolled (18 ga. & hvr.)	3.35 1.5.9.15	3.35 23	3.35 1.6.8	3.35 4.5			3.35 1.4.6.13		3.35 3	3.45 26		3.35 3		3.55 12
Cold-rolled	4.10 1.5 7.9.15.63		4.10 1.6.8	4.10 4.15		4.10 7	4.10 4.6		4.10 3			4.10 3	4.30 22	4.30 12
Galvanized (10 gage)	4.40 1.9.15		4.40 1.8		4.40 4		4.65 64 4.75 44					4.40 3		
Enameling (12 gage)	4.40 1		4.40 1.5	4.40 4		4.40 7	4.40 6 4.90 76						4.60 22	4.70 12
Long ternes (10 gage)	4.80 9.15		4.80 1			4.80 7	4.80 64							
Hi Str. low alloy, h.r.	5.05 1.5.9	5.05 1	5.05 1.6.8	5.05 4.5			5.05 1.4.6.13		5.05 3	5.05 26		5.05 3		5.25 12
Hi Str. low alloy, c.r.	6.20 1.5.9		6.20 1.6.8	6.20 4.5			6.20 4.6.13		6.20 3			6.20 3		6.40 12
Hi Str. low alloy, galv.	6.75 1											6.75 3		
STRIP Hot-rolled (over 6 in.)	3.25 5.7.9.23	3.25 3.66	3.25 1.6.8	3.25 5			3.25 1.4.6.13		3.25 3	3.35 26		3.25 3		3.45 12.47
Cold-rolled	4.15 5.7.9.63	4.30 3.66	4.30 8	4.15 2.5		4.15 7	4.15 4.6.13.40.43.49		4.15 3			4.15 3		4.40 68.91 4.35 12.47
Hi Str. low alloy, h.r.	4.95 9		4.95 1.6.8	4.95 5			4.95 1.4.6.13		4.95 3	4.95 26		4.95 3		5.15 12
Hi Str. low alloy, c.r.	6.20 9			6.20 2.5			6.20 4.6.13		6.20 3			6.20 3		6.40 12
TINPLATE† Cokes, 1.50-lb base box 1.25 lb, deduct 20¢	$7.50 1.5.9.15		$7.50 1.6.8				$7.50 4					$7.60 3	$7.70 22	
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.30 1.5.15		5.30 1.6				5.30 4					5.40 3	5.50 22	
BARS Carbon steel	3.45 1.5.9.17	3.45 1.4.23	3.45 1.6.8	3.45 4	3.45 4		3.45 1.4.6		3.45 3.4		3.45 3			3.65 12
Reinforcing‡	3.45 1.5	3.45 4	3.45 1.6.8	3.45 4			3.45 1.4.6		3.45 3.4		3.45 3	3.45 3		
Cold-finished	4.10 5 4.15 2.4 17.52.69.71	4.15 2 23.69.70	4.15 4.73.74	4.15 2.61	4.15 4.42.82		4.15 6.40.57		4.15 70					4.35 12 4.30 64
Alloy, hot-rolled	3.95 1.17	3.95 1.4.23	3.95 1.6.8		3.95 4		3.95 1.6.25	3.95 3	3.95 3.4		3.95 3			4.25 12
Alloy, cold-drawn	4.90 2.17.52.69.71	4.90 2.23.69.70	4.90 4.73.74	4.90 2.61	4.90 4.42.82		4.90 6.25.57	4.90 3	4.90 3.70					5.05 64
Hi Str. low alloy, h.r.	5.20 1.5		5.20 1.6.8	5.20 4			5.20 1.6	5.20 3	5.20 3		5.20 3			5.40 12
PLATE Carbon Steel	3.50 1.5	3.50 1	3.50 1.6.8	3.50 4			3.50 1.13		3.50 3	3.60 26	3.50 3	3.50 3		3.75 12
Floor plates	4.55 1	4.55 1	4.55 3	4.55 5						4.55 26				
Alloy	4.40 1	4.40 1	4.40 1				4.40 13			4.40 26	4.40 3	4.40 3		
Hi Str. low alloy	5.35 1.5	5.35 1	5.35 1.8	5.35 4.5			5.35 6			5.35 26	5.35 3	5.35 3		5.60 12
SHAPES, Structural	3.40 1.5.9	3.40 1.23	3.40 1.6.8					3.45 3	3.45 3		3.45 3			
Hi Str. low alloy	5.15 1.5	5.15 1	5.15 1.6.8				5.15 6	5.15 3	5.15 3		5.15 3			
MANUFACTURERS' WIRE Bright	4.50 2.5.18	4.50 2 4.12.33.34		4.50 2.77			4.50 6	Kokomo—4.60 80			4.50 3	4.60 3	Duluth—4.50 8 Pueblo—4.75 14	
PILING, Steel sheet	4.20 1.9	4.20 1							4.20 3					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
					INGOTS Carbon forging, net ton
	$59.00 83				Alloy, net ton
		$53.00 11	F=$72.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$71.00 83	$63.00 11	F=$82.00[19]	Geneva=$61.00[16]	Carbon forging billets, net ton
	$74.00 83		F=$85.00[19]		Alloy, net ton
				Portsmouth=$55.00[20]	SHEET BARS
					PIPE SKELP
	4.25 83	3.85 11	SF=4.50[24] LA=4.65[24,62]	Portsmouth=3.85[20] Worcester=4.15[2]	WIRE RODS
		3.35 4,11	SF, LA=4.05[24] F=4.25[19]	Ashland[7]=3.35 Niles=3.50[84]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.10 11	SF=5.05[24] F=5.00[19]		Cold-rolled
		4.40 4,11	SF, LA=5.15[24]	Ashland=4.40[7] Kokomo=4.50[30]	Galvanized (10 gage)
					Enameling (12 gage)
					Long ternes (10 gage)
		5.05 11	F=6.74[19]		Hi Str. low alloy, h.r.
			F=7.05[19]		Hi Str. low alloy, c.r.
					Hi Str. low alloy, galv.
3.85 83	3.65 83	3.25 11	SF, LA=4.00[24,62] F=4.40[19] S=4.25[62]	Ashland=3.25[7] Atlanta=3.40[65]	STRIP Hot-rolled
			F=5.40[19] LA=5.80[27]	New Haven=4.65[2,68]	Cold-rolled
		4.95 11	F=6.64[19]		Hi Str. low alloy, h.r.
			F=6.95[19]		Hi Str. low alloy, c.r.
		7.60 11	SF=8.25[24]		TINPLATE Cokes, 1.50-lb base box 1.25 lb, deduct 20¢
Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.05 83	3.85 83	3.45 4,11	SF, LA=4.15[24] LA=4.15[62]	Atlanta=3.60[65]	BARS Carbon steel
4.05 83	3.85 83	3.45 4,11	SF, S=4.20[62] F=4.10[19]	Atlanta=3.60[65]	Reinforcing‡
				Putnam, Newark=4.55[69]	Cold-finished
4.55 83	4.35 83		LA=5.00[62] F=4.95[19]		Alloy, hot-rolled
				Newark,[69] Worcester[2]=5.20 Hartford=5.20[4]	Alloy, cold-drawn
		5.20	F=6.25[19]		Hi Str. low alloy, h.r.
	3.90 83	3.50 4,11	F=4.10[19] S=4.40[62] Geneva=3.50[16]	Claymont=3.60[20] Coatesville=3.80[21] Harrisburg=3.50[35]	PLATE Carbon steel
				Harrisburg=4.55[35]	Floor plates
			F=5.40[19]	Coatesville=4.50[21]	Alloy
		5.35 11	F=5.95[19]	Geneva=5.35[16]	Hi Str. low alloy
4.00 83	3.90 83	3.40 84	SF=3.95[62] LA=4.00[24,62]	Phoenixville=3.30[56] Geneva=3.40[16]	SHAPES, Structural
		5.15 11	F=4.00[19] S=4.05[62]	Fontana=5.75[19] Geneva=5.15[16]	Hi Str. low alloy
5.10 83	4.90 83	4.50 4,11	SF, LA=5.45[24,62]	Portsmouth=4.50[20] Worcester=4.90[2]	MANUFACTURERS' WIRE Bright

Notes: †Special coated mfg ternes, deduct $1.00 from 1.50-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $1.90 from 1.50-lb coke base box. ‡Straight lengths only from producer to fabricator.

KEY TO STEEL PRODUCERS

With Principal Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Co., Inc., Oakland, Calif.
20 Portsmouth Steel Corp., Portsmouth, Ohio
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Indianapolis
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forgings Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	106	125§
Woven wire fence†	116	139
Fence posts, carloads††	116	...
Single loop bale ties	113	137
Galvanized barbed wire**	126	146
Twisted barbless wire	126	146

* Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet; Johnstown, 112.

	Base per 100 lb	Pittsburg, Calif.
Merch. wire, annealed‡	$5.35	$6.30
Merch. wire, galv.‡	5.60	6.55
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 20¢ at Chicago; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.
§ Torrance, 126.

PRODUCING POINTS — *Standard, Coated or galvanized nails, woven wire fence, bale ties, and barbed wire:* Alabama City, Ala., 4; Atlanta, 65; Aliquippa, Pa. (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only), 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City, 83.
Fence posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.
Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26; Warehame, Mass., 53.

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct,		
Coatesville, Pa. (21)	*25.60	
Washgtn, Pa. (39)	*26.50	
Claymont, Del. (29)	*26.50	
Conshohocken, Pa. (26)		*22.50
New Castle, Ind. (55)	*26.50	*24.00
Nickel-carbon		
10 pct, Coatesville (26)	27.50	
Inconel-carbon		
10 pct, Coatesville (21)	36.00	
Monel-carbon		
10 pct, Coatesville (21)	29.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		75.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

* Includes annealing and pickling, or sandblasting.

ELECTRICAL SHEETS

22 gage, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	†6.20
Electrical	†6.70
Motor	*7.95
Dynamo	8.75
Transformer 72	9.30
Transformer 65	9.85
Transformer 58	10.55
Transformer 52	11.35

PRODUCING POINTS—Beech Bottom, W. Va., 18; Brackenridge, Pa., 28; Follansbee, W. Va., 63†, add 0.25¢; Granite City, Ill., 22*, add 0.20¢; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

Numbers after producing points correspond to steel producers. See key on Steel Price page.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts, f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)
Base discount

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	27	38
9/16 & ⅝ in. x 6 in. & shorter	29	40
¾ in. & larger x 6 in. shorter	26	37
All diam., longer than 6 in.	22	34
Lag, all diam over 6 in. & longer	28	39
Lag, all diam x 6 in. & shorter	30	41
Plow bolts	40	—

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	25	37
9/16 to ⅝ in.	23	35
¾ to 1½ in. inclusive	23	35
1⅝ in. and larger	16	29

Semifinished Hexagon Nuts

(Less case lots)

	Pct Off List Reg	Hvy	Lt
½ in. and smaller	41	35	41
9/16 to ⅝ in.	36	30	36
¾ to 1½ in.	31	27	33
1⅝ in. and larger	21	17	...

In full case lots, 15 pct additional discount.

Stove Bolts

	Pct Off List
Packaged, steel, plain finish	63
Packaged, plated finish	50
Bulk, plain finish**	69*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.
**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Large Rivets

(½ in. and larger)
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa. $7.25

Small Rivets

(7/16 in. and smaller)
Pct Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 43

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	60
¼ in. through ⅝ in. x 6 in. and shorter high C heat treated	54
Milled studs	28
Flat head cap screws, listed sizes	24
Fillister head cap, listed sizes	43
Set screws, sq head, cup point, 1 in., diam and smaller x 6 in. and shorter	59

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.15¢
0.41 to 0.60 carbon	5.95¢
0.61 to 0.80 carbon	6.55¢
0.81 to 1.05 carbon	8.50¢
1.06 to 1.35 carbon	10.80¢

Worcester, add 0.30¢.

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$8.10
Old range, nonbessemer	7.95
Mesabi, bessemer	7.85
Mesabi, nonbessemer	7.70
High phosphorus	7.70

After Jan. 25, 1950, increases or decreases in Upper Lake rail freight, dock handling charges and taxes are for buyers' account.

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	$3.40
Joint bars, per 100 lb	4.40
Light rails, per 100 lb	3.75

	Base Price cents per lb
Track spikes†	5.60
Axles	5.25
Screw spikes	8.60
Tie plates	4.20
Tie plates, Pittsburgh, Torr., Calif.*	4.35
Track bolts, untreated**	8.85
Track bolts, heat treated, to railroads**	9.10

* Seattle, add 30¢.
** Minnequa, deduct 35¢
† Kansas City, 5.85¢.

PRODUCING POINTS—*Standard rails:* Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, Pa., 3.
Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, Pa., 3; Minnequa, Colo., 14.
Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.
Track spikes: Fairfield, Ala., 11; Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, Ohio, 6; Youngstown, 4.
Track bolts: Fairfield, Ala., 11; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 77, 78.
Axles: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 79; Johnstown, Pa., 3; McKees Rocks, Pa., 1.
Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburg, Calif., 24; Pittsburgh, 4; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minnequa, Colo., 14.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.00
18	4	1	—	5	$1.565
18	4	2	—	—	$1.13
1.5	4	1.5	8	—	71.5¢
6	4	2	6	—	76.5¢

High-carbon-chromium	57.5¢
Oil hardened manganese	32¢
Special carbon	29.5¢
Extra carbon	24.5¢
Regular carbon	21¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$13.50 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$15.50 to $16.00
Foundry, oven coke	
Buffalo, del'd	$20.90
Chicago, f.o.b.	21.00
Detroit, f.o.b.	20.40
New England, del'd	22.70
Seaboard, N. J., f.o.b.	22.90
Philadelphia, f.o.b.	20.45
Swedeland, Pa., f.o.b.	20.40
Painesville, Ohio, f.o.b.	21.90
Erie, del'd	$21.04 to 21.25
Cleveland, del'd	22.62
Cincinnati, del'd	22.71
St. Paul, f.o.b.	23.50
St. Louis, del'd	21.60
Birmingham, del'd	19.75

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net; Effective CaF, content:

70% or more	$37.00
60% or less	34.00

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.50	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	36.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50-27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	48.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	38.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

Numbers correspond to producers. See Key on Steel Price Page.

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38, 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1, 67; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Chicago, 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

REFRACTORIES (*F.o.b. works*)

Fire Clay Brick *Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) $86.00
No. 1 Ohio 80.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 80.00
No. 2 Ohio 72.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 14.00

Silica Brick

Mt. Union, Pa., Ensley, Ala. $86.00
Childs, Pa. 90.00
Hays, Pa. 91.00
Chicago District 95.00
Western, Utah and Calif. 101.00
Super Duty, Hays, Pa., Athens, Tex., Chicago 106.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 15.00
Silica cement, net ton, bulk, Hays, Pa. 17.00
Silica cement, net ton, bulk, Ensley, Ala. 16.00
Silica cement, net ton, bulk, Chicago District 16.00
Silica cement, net ton, bulk, Utah and Calif. 22.50

Chrome Brick *Per Net Ton*

Standard chemically bonded, balt., Chester $69.00

Magnesite Brick

Standard, Baltimore $91.00
Chemically bonded, Baltimore 80.00

Grain Magnesite *St. ⅝-in. grains*

Domestic, f.o.b. Baltimore, in bulk, fines removed ... $56.00 to $56.50
Domestic, f.o.b Chewelah, Wash., in bulk with fines ..... 30.50 to 31.00
in sacks with fines ..... 35.00 to 35.50

Dead Burned Dolomite

F.o.b producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ ... $12.25

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags ... 7.4¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots ..... 9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe ..... 31.5¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe ..... 48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+%Fe .. 63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micros, 98%, 99.8+% Fe ..... 90.0¢ to $1.75
Aluminum ..... 29.00¢
Antimony ..... 42.53¢
Brass, 10 ton lots ..... 23.25¢ to 26.75¢
Copper, electrolytic ..... 28.625¢
Copper, reduced ..... 28.50¢
Cadmium $2.40
Chromium, electrolytic, 99% min. $3.50
Lead ..... 18.50¢
Manganese ..... 55.00¢
Molybdenum, 99% $2.65
Nickel, unannealed ..... 61.00¢
Nickel, spherical, minus 30 mesh, unannealed ..... 68.00¢
Silicon ..... 34.00¢
Solder powder ..... 8.5¢ plus metal cost
Stainless steel, 302 ..... 75.00
Tin ..... 86.50¢
Tungsten, 99% $2.90
Zinc, 10 ton lots ..... 15.50¢ to 18.25¢

ELECTRODES

Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
	GRAPHITE	
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
	CARBON	
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

PIPE AND TUBING

Base discounts, f.o.b mills
Base price, about $200.00 per net ton

Standard, T & C

Steel, Buttweld*	*Black*	*Galv*
⅛-in.	40½ to 38½	24 to 22
¾-in.	43½ to 41½	28 to 26
1-in.	46 to 44	31 to 29
1¼-in	46½ to 44½	31½ to 29½
1½-in.	47 to 45	32 to 30
2-in.	47½ to 45½	32½ to 30½
2½ to 3-in.	48 to 46	33 to 31

Steel, lapweld			
2-in	37		23½ to 22½
2½ to 3-in.	41	to 40	25½ to 24½
3½ to 6-in.	44	to 40	28½ to 24½

Steel, seamless		
2-in.	36	20½
2½ to 3-in.	39	23½
3½ to 6-in.	41	25½

Wrought Iron, buttweld		
⅛-in.	+26½	+53
¾-in.	+16½	+42
1 & 1¼-in.	+10½	+33
1½-in.	+ 4½	+29½
2-in.	+ 4	+29

Wrought Iron, lapweld		
2-in.	+13½	+37
2½ to 3½-in.	+11	+32½
4-in.	+ 6	+26½
4½ to 8-in.	+ 8	+28
9 to 12-in.	+18	+37½

Extra Strong, Plain Ends

Steel, buttweld		
⅛-in.	39½ to 37½	24½ to 22½
¾-in.	43½ to 41½	28½ to 26½
1-in.	45½ to 43½	31½ to 29½
1¼-in.	46 to 44	32 to 30
1½-in.	46½ to 44½	32½ to 30½
2-in.	47 to 45	33 to 32
2½ to 3-in.	47½ to 45½	33½ to 31½

Steel, lapweld			
2-in.	37	to 36	22½ to 21½
3½ to 3-in.	42	to 40	27½ to 25½
3½ to 6-in.	45½	to 41½	41 to 29

Steel, seamless		
2-in.	35	20½
2½ to 3-in.	39	24½
3½ to 6-in.	42½	28

Wrought Iron, buttweld		
⅛-in.	+22	+47
¾-in.	+15½	+40
1 to 2-in.	+ 5½	+29

Wrought Iron, lapweld		
2-in.	+10½	+33½
2½ to 4-in.	+ 1	+22
4½ to 6-in.	+ 5	+26½
7 & 8-in.	list	+21½
9 to 12-in.	+11½	+29½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. *Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut lengths 10 to 24 ft inclusive.

OD in in.	gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	$20.61	$24.24	$19.99	$23.51
2½	12	27.71	32.58	26.88	31.60
3	12	30.82	36.27	29.90	35.18
3½	11	38.52	45.38	37.36	43.99
4	10	47.82	56.25	46.39	54.56

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Cicago ... $91.80 to $95.30
6 to 24-in., del'd N. Y. ..... 91.00 to 92.00
6 to 24-in., Birmingham ... 78.00 to 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less ..... $108.50 to $113.00
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 20¢ to base price except Birmingham, Cincinnati, Los Angeles, New Orleans (*), add 15¢; Philadelphia, add 25¢).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.05	6.24-6.44[1]	6.46-6.46[2]	5.59-5.59[11]	....	5.20-5.64[11]	5.49	5.49-5.49[11]	6.19	9.69	9.99	11.12	11.49
Birmingham*	5.05[10]	5.80	6.15[7]	5.10[10]	....	5.20	5.05	5.00[10]	6.73	....	....	....	....
Boston	5.73	6.48[20]-6.85	6.79-7.24[21]	5.76	6.90-6.95	5.86	5.55	5.60	6.02-6.58	9.70-9.97	8.50-10.37	11.15	11.48
Buffalo	5.05	5.80	6.80	5.41	7.27	5.45	5.15	5.05	5.75	9.60	9.90	11.05	11.35
Chicago	5.05	5.80	6.70	5.10	5.45-6.16	5.20	5.05	5.00	5.65	9.25	9.55	10.70	11.00
Cincinnati*	5.32-5.97	5.80-6.24	6.29-6.39	5.49	....	5.59-5.74	5.44-5.59	5.39-5.54	6.10-6.25	9.60-9.81	9.90-10.11	11.05-11.26	11.35-11.56
Cleveland	5.05	5.80	6.95	5.24	6.35	5.32	5.17	5.12	5.75	9.36	9.66	10.81	11.11
Detroit	5.33	6.08	7.09	5.49	6.27-6.58	5.59	5.44	5.39	6.03	9.56	9.86	11.01	11.31
Houston	5.75	....	....	6.10	....	6.00	5.95	6.10	7.80	10.35-10.45	10.50-10.60	11.50	11.85-12.10
Indianapolis	....	....	....	....	7.38	....	....	....	....	....	....	....	....
Kansas City	5.65	6.40	7.30	5.70	6.95	5.80	5.65	5.60	6.35	9.85	10.15	11.30	11.60
Los Angeles*	5.80	7.00	7.45[3]	5.85	7.35-7.85[16]	5.80	5.70	5.80	7.55-6.51	10.05	10.20	11.70	12.10
Memphis	5.93	6.68	....	5.98	6.80	6.08	5.93	5.68	....	....	....	....	....
Milwaukee	5.19	5.94	6.84	5.24	6.32	5.34	....	5.14	5.89	9.39	9.69	10.84	11.14
New Orleans*	5.50[1]	6.85[1]	....	5.55[1]	6.90[1]	5.65	5.55[1]	5.55[1]	6.75	....	....	....	....
New York	5.55-5.65	6.54-6.64	6.90-7.00	5.84	6.76[1]	5.70	5.45	5.65	6.44	9.60	9.90	11.05	11.35
Norfolk	6.10	7.00	....	6.30	....	6.15	6.20	6.15	7.20	....	....	....	....
Omaha	....	....	....	....	....	....	....	....	....	....	....	....	....
Philadelphia*	5.30	6.20	6.70	5.65	6.29	5.45	5.25	5.50	6.31	9.35	9.65	10.80	11.10
Pittsburgh	5.05	5.80	6.70	5.20	6.00	5.20	5.05	5.00	5.75	9.25	9.55	10.70	11.00
Portland	6.60-7.10[1]	8.40[2]	8.20[2]	6.85[9]	....	6.40[9]	6.50	6.45-6.45[9]	8.60[14]	12.00[18]	11.60[18]	....	....
Salt Lake City	5.85	6.70	8.75	7.45	8.75	6.10[3]	5.90	7.35[9]	8.75	....	....	....	....
San Francisco	6.25[11]	7.60[2]	7.50[2]	6.75[11]	8.25	6.15[11]	6.00	6.15[11]	7.80	10.05	10.20	11.70	12.10
Seattle	6.70[4]	8.15[2]	8.20[2]-8.35[2]	6.90[4]	....	.35[4]	6.25[4]	6.35[4]	8.50[14]	....	11.60[18]	....	13.50[18]
St. Louis	5.38	6.13	7.03	5.43	6.68-7.54	5.53	5.38	5.33-5.35	6.08	9.58	9.88	11.03	11.33
St. Paul	5.76	6.51	7.41	5.81	6.16-6.82	5.91	5.76	5.71	6.42	9.96	10.26	11.41	11.71

BASE QUANTITIES: *(Standard unless otherwise keyed on prices).*

Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets: 2000 to 9999 lb. Cold-finished bars: 1000 lb or over. Alloy bars: 1000 to 1999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

Exceptions:

(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 to 5999 lb; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 400 to 9999 lb; (10) 500 to 9999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 9999 lb; (16) 6000 lb and over; (17) up to 1999 lb; (18) 1000 to 4999 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity; (21) 3 to 24 bundles.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	48.50	49.00	49.50	.....
Birmingham	41.88	42.38	....	....	.....
Buffalo	46.00	46.50	47.00	....	.....
Chicago	46.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	....	50.50	51.00	....	.....
Granite City	47.90	48.40	48.90	....	.....
Ironton, Utah	46.00	46.50	....	....	.....
Pittsburgh	46.00	46.50	46.50	47.00	.....
Geneva, Utah	46.00	46.50	....	....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	....	....	....	.....
Swedeland	48.00	48.50	49.00	49.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	48.00	48.50	49.00	....	54.00
Youngstown	46.00	46.50	46.50	47.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	50.50	51.00	.....	.....
Boston	Steelton	6.90	.....	....	....	....	60.90
Brooklyn	Bethlehem	4.29	....	52.79	53.29	53.79	.....
Cincinnati	Birmingham	6.70	48.58	49.08	....	....	.....
Jersey City	Bethlehem	2.63	....	51.13	51.63	52.13	.....
Los Angeles	Geneva-Ironton	7.70	53.70	54.20	....	....	.....
Mansfield	Cleveland-Toledo	3.33	49.33	49.83	49.83	50.33	54.33
Philadelphia	Bethlehem	2.39	50.39	50.89	51.39	51.89	.....
Philadelphia	Swedeland	1.44	49.44	49.94	50.44	50.94	.....
Philadelphia	Steelton	3.09	....	....	....	....	57.09
Rochester	Buffalo	2.63	48.63	49.13	49.63	....	.....
San Francisco	Geneva-Ironton	7.70	53.70	54.20	....	....	.....
Seattle	Geneva-Ironton	7.70	53.70	54.20	....	....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	....	.....
Syracuse	Buffalo	3.58	49.58	50.08	50.58	....	.....

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct C/L per g.t., f.o.b. Jackson, Ohio—$57.00; f.o.b. Buffalo, $58.25. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $60.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $68.56. High phosphorus charcoal pig iron is not being produced.

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contact base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Clairton, Pa.	$175

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05
Less ton lots	12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Manganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90
Less ton lots	12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $77.00 gross ton, freight allowed to normal trade area; Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $73.50. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	17.00	75% Si	13.50
50% Si	11.30	85% Si	14.65
90-95% Si			16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max Si.)

0.06% C	28.75	0.20% C	27.75
0.10% C	28.25	0.50% C	27.50
0.15% C	28.00	1.00% C	27.25
2.00% C			27.00
65-69% Cr, 4-9% C			20.50
62-66% Cr, 4-6% C, 6-9% Si			21.35

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	$1.09
0.50% max. C	1.05
9.00 min. C	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 20.50¢ per lb of contained Cr plus 11.30¢ per lb of contained Si.

Bulk 1-in. x down, 20.65¢ per lb contained Cr plus 11.50¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.65¢
Ton lots	9.05¢
Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo	96¢
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo	$1.13
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.28
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads per net ton	$160.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	95¢
bags, f.o.b. Washington, Pa., Langeloth, Pa.	94¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk, lump	11.00¢
Ton lots, bulk, lump	11.50¢
Ton lots, packed, lump	11.75¢
Less ton lots, lump	12.25¢
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.20
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk	6.60¢

Boron Agents

Contract prices, per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$4.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots	$1.20
F.o.b. Wash., Pa.; 100 lb and over	
10 to 14% B	.75
14 to 19% B	1.20
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcax, contract basis, delivered.	
Ton lots	45.00¢

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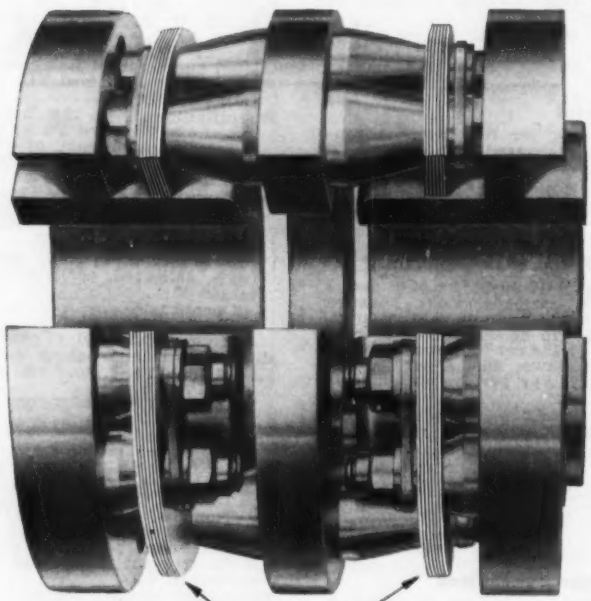

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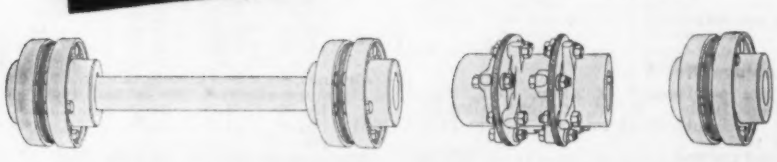

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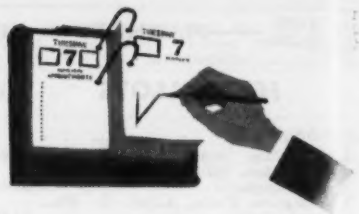


Dates to Remember

Mar. 16-17—Pressed Metal Institute, technical symposium, Hotel Carter, Cleveland. Institute headquarters are at 13210 Shaker Sq., Cleveland.

Mar. 2025—Concrete Reinforcing Steel Institute, annual meeting, Shamrock Hotel, Houston. Institute headquarters are at 38 S. Dearborn St., Chicago.

Mar. 21-22—Steel Founders' Society of America, annual meeting, Edgewater Beach Hotel, Chicago. Society headquarters are at 101 Prospect Ave., Cleveland.

Apr. 3-4—Assn. of Iron & Steel Engineers, spring conference, Birmingham. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

Apr. 4—Society for Applied Spectroscopy, meeting, Socony-Vacuum Training Center, New York. Society secretary is Ruth Abbott, American Cyanamid Co., Bound Brook, N. J.

Apr. 4-7—National Assn. of Corrosion Engineers, annual conference, Hotel Jefferson, St. Louis. Association headquarters are in Milam Bldg., Houston.

Apr. 5-7—American Institute of Electrical Engineers, electric welding conference, Rackham Educational Memorial Bldg., Detroit. Institute headquarters are at 33 W. 39th St., New York.

Apr. 5-7—Midwest Power Conference, Sherman Hotel, Chicago. Conference director is Roland A. Budenholzer, Illinois Institute of Technology, 3300 S. Federal St., Chicago.

Apr. 10-12—American Institute of Mining & Metallurgical Engineers, annual open-hearth, blast furnace, coke oven and raw materials conference, Netherland Plaza Hotel, Cincinnati. AIME headquarters are at 29 W. 39th St., New York.

Apr. 10-12—American Society of Lubrication Engineers, annual convention, Hotel Statler, Detroit. Society headquarters are at 343 S. Dearborn St., Chicago.

Apr. 10-14—American Society of Tool Engineers, industrial cost-cutting exposition, Philadelphia Convention Hall, Philadelphia. Society headquarters are at 10700 Puritan Ave., Detroit.

Apr. 11-12—American Zinc Institute, annual meeting, Hotel Statler, St. Louis. Institute headquarters are at 60 E. 42nd St., New York.

Apr. 12-14—American Society of Mechanical Engineers, spring meeting, Hotel Statler, Washington. Society headquarters are at 29 W. 39th St., New York.

Apr. 12-14—National Petroleum Assn., semiannual meeting, Cleveland. Association headquarters are in Munsey Bldg., Washington.

Apr. 13-14—American Machine Tool Distributors Assn., spring meeting, Edgewater Beach Hotel, Chicago. Association secretary is Thos. A. Fernley, Jr., 505 Arch St., Philadelphia.

Apr. 24—Packaging Machinery Manufacturers Institute, semiannual meeting, Hotel Sheraton, Chicago. Institute headquarters are at 342 Madison Ave., New York.

Apr. 25-26—Metal Powder Assn., annual metal powder show, Book-Cadillac Hotel, Detroit. Association headquarters are at 420 Lexington Ave., New York.

Apr. 27-28—American Steel Warehouse Assn., annual meeting, Shamrock Hotel, Houston. Association headquarters are at 442 Terminal Tower, Cleveland.

FREE

PUBLICATIONS

Continued from Page 36

shipyard and car-building tools are presented in a 24-p. catalog. *Beatty Machine and Mfg. Co. For more information, check No.* 12 *on the postcard on p.* 37.

Die Blocks

Finkl Mo-Lyb-Die processed die blocks, inserts and tools in the quenched, tempered and ready-for-use state are described in a new 22-p. booklet pointing out a number of advantages. *A. Finkl & Sons Co. For more information, check No.* 13 *on the postcard on p.* 37.

Safety Plate

How to convert problem floors to model floors through use of Inland 4-Way safety plate is the subject of a new 12-p. bulletin. *Inland Steel Co. For more information, check No.* 14 *on the postcard on p.* 37.

Power Shears

Steelweld quiet operating pivot blade shears, designed for heavy duty production work, are covered in an 8-p. catalog listing some unique features. *Cleveland Crane & Engineering Co. For more information, check No.* 15 *on the postcard on p.* 37.

Lathe Tool Bits

Du-Bits, the lathe tool bits with point and lead clearance already formed in the blank, are available in several steel grades and a variety of sizes, as shown in a new 1-p. bulletin. *Dow Mechanical Corp. For more information, check No.* 16 *on the postcard on p.* 37.

Line Clamps

Five new cushioning materials have been added to the 32-p. 1950 catalog showing detailed prints, material finishes, specifications and ranges of sizes for standard bare

why starve your automatics . . .

FOLLANSBEE COLD ROLLED STRIP feeds right from the coil into your automatic machines. There's real efficiency and time-saving economy in the continuous supply of presses, roll-formers, and other automatics. These high-speed machines need never starve for material because you can feed Follansbee Cold Rolled Strip directly from the coil.

making gadgets for gourmets?

FOLLANSBEE COLD ROLLED STRIP is manufactured in a range of tempers, and with the proper finish, for making turners, mixers, beaters, and a myriad other profitable specialties. Custom-made Follansbee Cold Rolled Strip, in continuous coils, is furnished to your specifications. You should be taking advantage of the machining quality of Follansbee Cold Rolled Strip and Follansbee Polished Blue Strip. Just call the Follansbee Steel Representative nearest you.

FOLLANSBEE STEEL CORPORATION

Stuart's ThredKuT

D. A. STUART'S THREDKUT straight, or in rich blend, provides fine finish on tough, stringy materials because its high sulphur content gives it excellent anti-weld characteristics.

In long dilutions THREDKUT delivers long tool life and outstanding performance at low cost on free cutting, high speed operations.

THREDKUT'S exceptionally broad range of usefulness makes it cost less than "cheaper" products in the majority of cases and often eliminates the need for several different types of oils. When it comes to *performance* on the jobs within its range, *none can best it!* Write for details and literature.

100% of All Metal Cutting Jobs Can Be Done at Lower Cost with D. A. Stuart's Wise Economy Plan.

Ask about it!

OUR 85TH YEAR

D.A. Stuart Oil CO.

EST. 1865 LIMITED

2737 South Troy Street, Chicago 23, Illinois

FREE PUBLICATIONS

Continued

metal and cushioned line support clamps and blocks. *Thomas Associates. For more information, check No. 17 on the postcard on p. 37.*

Roof Protection

The how and why of roof protection, causes of roof troubles and methods for eliminating frequent roof difficulties are explained in a 4-p. folder. *United Laboratories, Inc. For more information, check No. 18 on the postcard on p. 37.*

Nodular Iron

"The production of Nodular Cast Irons With Cerium—Some Practical Details," is the subject of an 8-p. booklet giving actual practice in adding cerium to the foundry melt, as developed by the British Cast Iron Research Assn. for its members. *Cerium Metals Corp. For more information, check No. 19 on the postcard on p. 37.*

Shaft Data

A collection of useful data on shafting for the designer and engineer is presented in a new 20-p. bulletin, along with information on De Laval worm gearing and other products. *De Laval Steam Turbine Co. For more information, check No. 20 on the postcard on p. 37.*

Finishing Machines

The new Hammond Super Model K-46-6 indexing rotary automatic finishing machines, claiming world's fastest indexing and featuring variable work spindle speeds and dwell time, are described in the 8-p. catalog No. 50. *Hammond Machinery Builders, Inc. For more information, check No. 21 on the postcard on p. 37.*

Dielectric Heaters

The inside story of high frequency dielectric heating is told in a new 12-p. bulletin setting forth 9 operating advantages for this process and portraying a number of applications. *Allis-Chalmers Mfg. Co. For more information, check No. 22 on the postcard on p. 37.*

Resume Your Reading on Page 37

NEW PRODUCTION IDEAS

Continued from Page 40

easy removal of the insert. *Super Tool Co. For more information, check No.* 36 *on the postcard on p.* 37.

Coolant Pumps

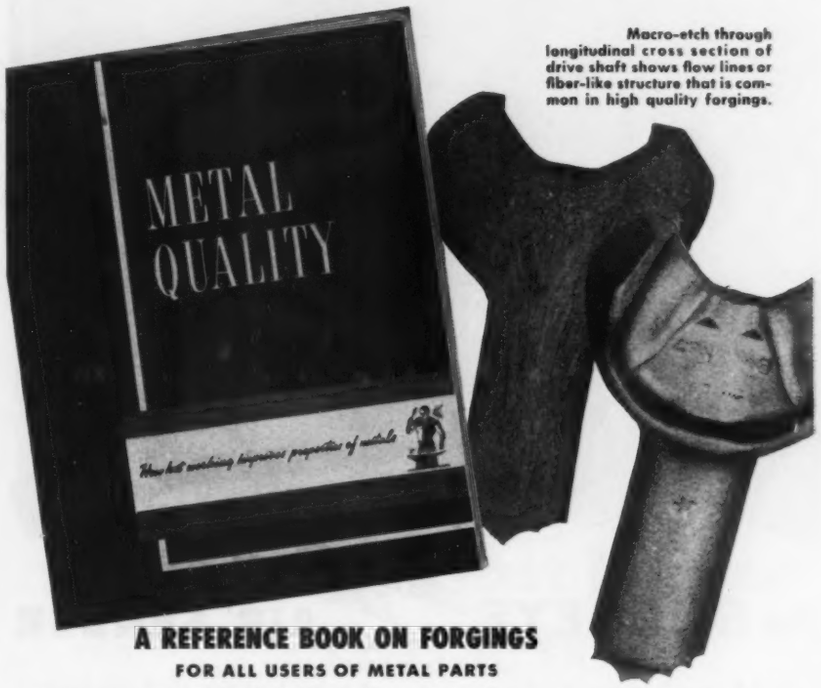
A line of centrifugal coolant pumps, conforming to JIC standards, permits the use of any NEMA motor. A flexible coupling and a motor-mounting bracket are used to mount any standard motor. Assemblies include a submersible type for

installation inside the coolant tank (shown at left). The center assembly is built to mount on the side of a coolant tank or machine pedestal for a close-coupled installation. No auxiliary inlet piping is required. The assembly on the right is for various types of connections to the driving unit and may be operated in a horizontal or vertical position. *Pioneer Pump & Mfg. Co. For more information, check No.* 37 *on the postcard on p.* 37.

Magnet

Designed for research, laboratory and industrial use, the GM-1 Gouy Magnet measures magnetic susceptibilities. Industrial uses include detection of ferro-magnetic impurities and determination of carbon content in steels. The magnet consists of a U-shaped soft iron yoke, two cylindrical pole pieces, two

FORGINGS PROVIDE MATCHLESS CAPACITY FOR THE TOUGHEST WORK LOADS



Macro-etch through longitudinal cross section of drive shaft shows flow lines or fiber-like structure that is common in high quality forgings.

A REFERENCE BOOK ON FORGINGS
FOR ALL USERS OF METAL PARTS

Sixty pages of authoritative information on metal quality as developed in forgings formed through the use of closed impression dies. Forging production techniques are described and illustrated; economic advantages of forgings are presented from the viewpoint of top management, design engineers, metallurgists and production executives. Your copy is ready. Fill in and attach coupon below to your business letterhead.

* * *

A product fortified with the metal quality found in forgings outperforms other products. Forgings' grain structure and fiber-like flow lines are controlled, directioned, and concentrated at points where the highest stress and shock occur under actual service conditions. High tensile and impact strength, the reduction of dead weight, and freedom from concealed defects are some of the advantages which are obtainable in forgings.

Now is an excellent time to check your product for cost reductions—explore every possibility to improve performance and appearance, while reducing dead weight of component parts. Double check all parts subject to the greatest stress and strain. Check machining and finishing time schedules—forgings have been known to speed up production by 250 per cent. Rejects at the point of assembly are costly—a needless waste; forgings offer practically a 100 per cent yield of sound parts—and they respond uniformly to heat treatment. Consult a forging engineer—only a forging engineer can inform you fully regarding the many advantages obtainable with forgings.

DROP FORGING ASSOCIATION
605 HANNA BUILDING
CLEVELAND 15, OHIO

Please send 60-page booklet entitled "Metal Quality – How Hot Working Improves Properties of Metal", 1949 Edition.

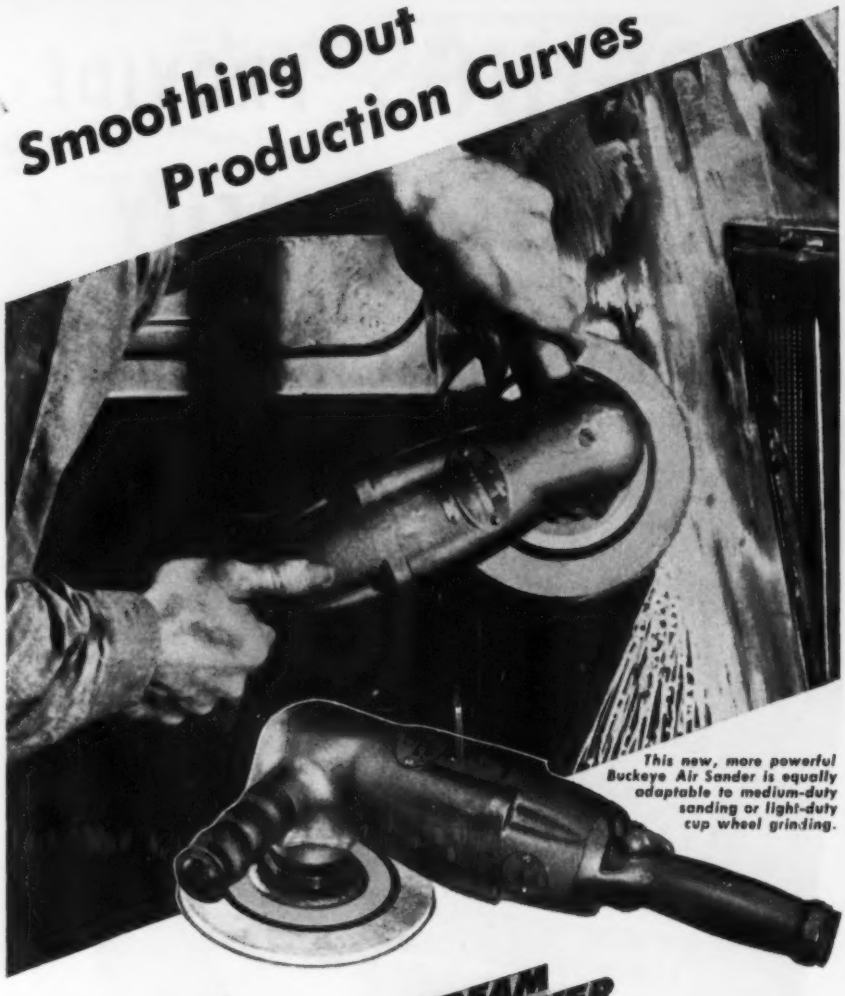
Name .....

Position .....

Company .....

Address .....

Smoothing Out Production Curves



This new, more powerful Buckeye Air Sander is equally adaptable to medium-duty sanding or light-duty cup wheel grinding.

The BUCKEYE STREAM POWER AIR SANDER

• The new Buckeye Air Sander is one of many Buckeye Air Tools used by Advance Auto Body Works in the manufacture of truck bodies and tank and trailer units for the petroleum and motor transportation industries. On fabrication work, weld removal and tank and body finishing, Buckeye Air Tools have reduced maintenance costs, tool down time and lost man-hours . . . have helped maintain a higher rate of productivity at this Los Angeles plant.

Designed and built to stay on the job, Buckeye Air Tools can help you maintain productive output at profitable levels. We'll gladly demonstrate, in your own plant, without obligation—and let you be the judge.

AIR TOOLS:

• Horizontal Grinders and Buffers • Vertical Grinders and Sanders • Belt Sanders • Shears Nibblers • Air Wrenches • Drills Screwdrivers

HIGH FREQUENCY ELECTRIC TOOLS:

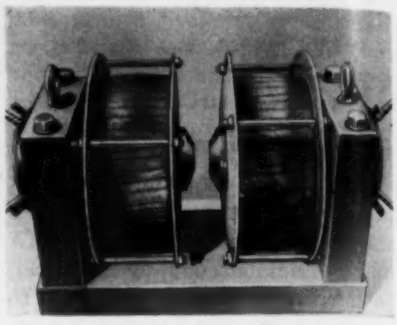
• Grinders • Buffers • Sanders Polishers • Drills • Screwdrivers Nutrunners

NEED HELP on Air Tool Problems?

Send now for your copy of the informative Buckeye Air Tool Catalog.

Buckeye Tools
CORPORATION
DIVISION 11 • DAYTON 1, OHIO

coils mounted on the pole pieces and two removable pole faces. A high intensity magnetic field is developed with minimum fluctuation in field strength. Field strength ranges from 8000 to 25,000 gauss depending on the gap between the pole faces, which is adjustable from a 2¼ in. max to a ½ in. min. *Dings Magnetic Separator Co. For more information, check No.* 38 *on the postcard on p.* 37.

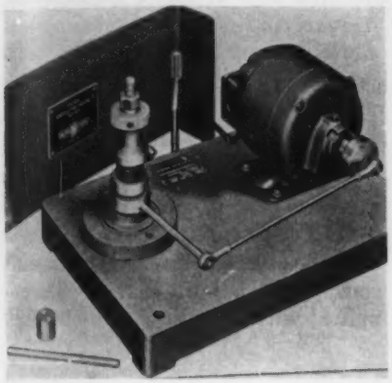


Towing Tractor

A new towing tractor which need not be ridden to be operated, will tow 10 tons on trailers over a level course at speeds from 1 to 6.5 hp. With a combination clutch-and-throttle control bar extending across the width of the Clarkette-5 above the cowl, the driver can operate the machine while walking on either side of it. Weight of the train acts as a brake, giving the driver time to pick and place items on the trailers. In normal driving position, the operator stands on a platform only a few inches higher than the floor. A back rest provides safety and comfort. The machine has small turning radius and easy maneuverability in narrow aisles. *Clark Equipment Co. For more information, check No.* 39 *on the postcard on p.* 37.

Grease Tester

Testing lubricants to be used for anti-friction bearings undergoing small angle vibratory movements is possible with an apparatus that evaluates the lubricating properties. In operation the test grease is applied to a simple lever that



exerts thrust through a calibrated spring. An electric motor is started to oscillate the test bearings through an angle of 12°, at a rate of 3450 reversals per min under a thrust load of 550 lb. The test is run continuously for 50 hr before the bearings are weighed and washed again. The test is comparative and the loss of weight in milligrams indicates the suitability of the lubricant. *Precision Scientific Co. For more information, check No. 40 on the postcard on p. 37.*

Alloy Steel Boxes

A lightweight basket that will carry work through subsequent operations, such as heat treating, quenching, annealing, cyaniding,

and nitriding, can be made from any metal that can be spot welded. The bottom of wire mesh or expanded metal provides a perfect drain. Corrugated side walls give vertical strength to thin sections, permit stacking and add materially

SHENANGO-PENN *Centrifugal* CASTINGS ... KEY TO SAVINGS

Bronze cylinder centrifugally cast and precision finished to specification by Shenango-Penn for use in manufacture of corrugated paper.

Major parts last longer ... cost less!

TAKE this special bronze forming roll cover, for example. Because it is a Shenango-Penn *centrifugal* casting, it combines complete uniformity, exceptionally fine, pressure-dense grain, and freedom from blow holes, sand inclusions and other common, often hidden defects.

The money-saving result, quite naturally, is greatly prolonged wear life and the plus strength that will take abnormal loads and speeds without risking costly failure in service.

This is just one of the countless types of cylinders, sleeves, liners, rings, rolls and roll assemblies produced by Shenango-Penn in ferrous and non-ferrous metals for various industries. When *you* need such parts . . . rough, semi-machined or precision finished, small or large . . . specify Shenango-Penn and profit by Shenango-Penn's specialized processes, facilities and experience.

MEANWHILE, ASK FOR BULLETIN

No. 143—Centrifugal castings of non-ferrous metals and alloys.

No. 144—Centrifugal and static castings of plain and alloyed irons.

No. 145—Centrifugally cast bushing stock in all standard sizes.

SHENANGO-PENN MOLD COMPANY
582 West Third Street Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO PENN

All Bronzes • Monel Metal • Ni-Resist • Meehanite Metal ®

"See how DUCTILE it is, Plunkett!"

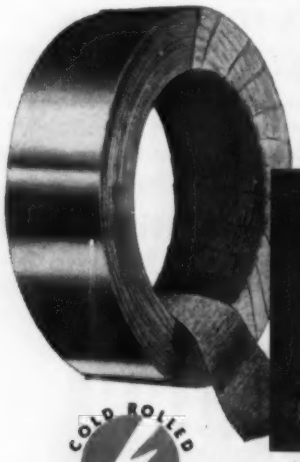
Production tied in knots because of hard-to-work materials? No need to strangle your production manager! Easy-to-fabricate Thomas Strip will help untangle your knottiest problem . . . and will tie down soaring costs at the same time. Harried production people welcome it. Furnished in a wide range of tempers—from No. 5, dead soft and extremely ductile, through intermediate ranges—it fits your equipment, process and product. Its always-right temper saves yours!

★ ★ ★

Try copper-coated Thomas Strip, for example—widely used to help protect parts in process against rust. Fabricating possibilities are practically unlimited: it can be stamped, punched, sheared, formed, bent, twisted, rolled, beaded and otherwise cold-worked—all without damage to the tight copper *pre-coat.* It can be furnished in special deep drawing quality—with the ductile copper *pre-coat* acting as an effective die lubricant, stretching die life and cutting retooling costs. It is especially economical for soldering, tinning and brazing operations.

Available natural, planished and buffed, it serves both as the final product finish, or as a ready base for further plating. Its use often eliminates costly batch plating and buffing of formed and drawn parts.

Why not see it for yourself? We'll be happy to arrange for a test run in your plant, on your equipment and at your convenience. Just write:



THE THOMAS STEEL COMPANY
WARREN, OHIO
Specialists in Cold Rolled Strip Steel

Thomas Strip
SPEEDS PRODUCTION . . . CUTS COSTS

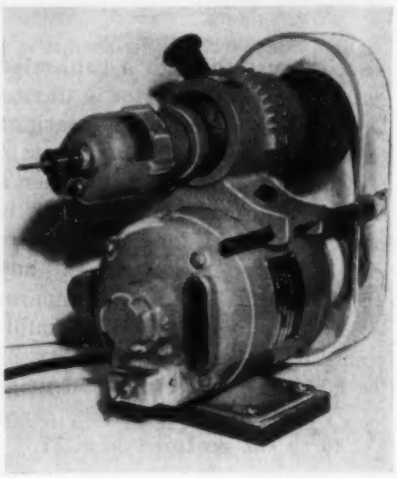
COLD ROLLED STRIP STEEL

Electrocoated with Chromium, Nickel, Copper, Brass and Zinc • Hot Dipped Tin and Lead Alloy • Lacquer Coated in Colors • Alloy Strip Steel • Uncoated Strip Steel • Produced to Your Specifications.

to heat transfer. Boxes can be reinforced for heavier loads and can be made any size to meet specific conditions. The box illustrated measures 30 in. long x 12 in. wide x 4 in. high and weighs 9½ lb. *Alloy Engineering Co. For more information, check No.* 41 *on the postcard on p.* 37.

Bench Type Tapper

Tapping and drilling operations can be performed with a bench type torque-driven Torqomatic using a tapping attachment. Complete unit consists of a built-in type Torqomatic with plastic-guard-enclosed

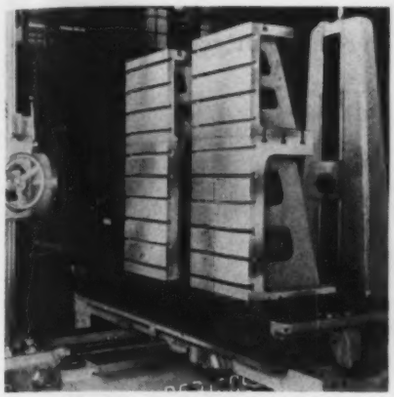


pulley drive powered by the desired electric motor. Three models are available: 101 from 0 to 3/16 in., 202 from 3/16 to 5/16 in. and 303 from 5/16 to ⅝ in. *Charles L. Jarvis Co. For more information, check No.* 42 *on the postcard on p.* 37.

Angle Plate

A new precision-type angle plate is being manufactured for use on horizontal boring machines, planers, milling machines and radial drill presses where accuracy in the machined part is of primary importance. The material used is close grained cast iron, rough machined, normalized for stress relief to prevent warping and then finish machined on all faces and edges. Heavy rear reinforcing ribs and a thickness of metal under the T slots equal to that of the face in-

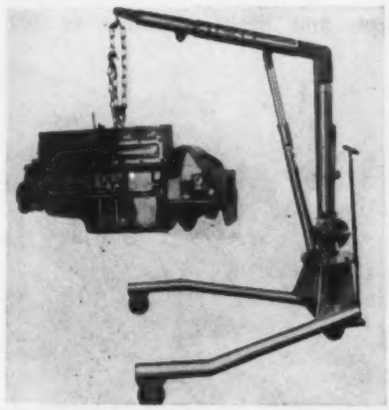
sure rigidity. These angle plates are made in two sizes: 4 and 6 slot. When bolted together they provide height of a 10 slot plate. All slots



take American Standard ¾ T bolts. *Portage Machine Co. For more information, check No. 43 on the postcard on p. 37.*

Shop Truck

This new Utility hoist can be used on a 3-wheel tubular steel floor frame, or be quickly converted for use on truck beds, work benches and loading docks. It features fast hydraulic operation that will lift a ¾ ton load 77½ in. in 45 sec and



by using a short hook-up, 2000 lb can be lifted 52 in. in 45 sec. When mounted on a truck, the 45-in. boom will swing in a full circle. *Unit Mfg. Co. For more information, check No. 44 on the postcard on p. 37.*

Split Washers

Quick, on-the-spot repair and economical operation are possible with the new split washers designed to facilitate repair. A ma-

I know—
"CERTIFIED"
is the best abrasive
As Purchasing Agent I have to see that the abrasive we use is the most economical. This means a hard, slow wearing abrasive like "Certified" . . . one that can be used over and over. An abrasive that does a good job in the cleaning room . . . one that gets castings really clean in a hurry.
"CERTIFIED" IS TOPS! Each grain of Samson Shot and Angular Grit is a solid homogenous mass that wears slowly, lasts longer for top-efficiency blast cleaning at lowest cost. "Certified's" special automatically controlled hardening process gives 'em plenty of extra hardness for cleaner castings. Order "Certified" today for faster, better, cheaper blast cleaning.
ANGULAR
GRIT
BOSTON, MASS.
USE NO HOOKS
Always specify "Certified"
PITTSBURGH CRUSHED STEEL CO.
PITTSBURGH, PENNA.
STEEL SHOT AND GRIT CO.
BOSTON, MASS.

A specialized compound
for every burnishing job

NO MATTER what metals you burnish, or what media you use, Wyandotte can supply you with the *right* burnishing compound for the job.

Wyandotte Burnishing Compound 317, for example, is recommended for ball burnishing zinc, nickel or Monel metal parts. This liquid, soapless compound gives a bright, smooth finish, rinses freely and leaves no scum on the work or in the barrel. It is efficient and economical to use in even the hardest water.

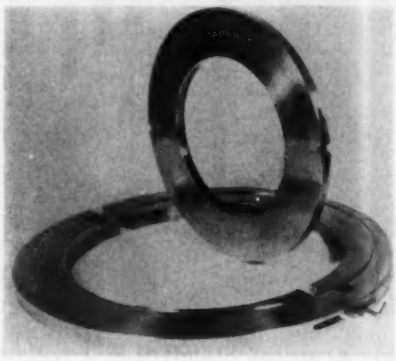
Wyandotte Burnishing Compound 321 provides a brilliant luster to parts of brass, copper, bronze, stainless or carbon steel. A soap-type compound, it may be used for ball burnishing or for combined burnishing and burring with chips or stones.

If you'd like complete technical information on these and other burnishing compounds in the complete Wyandotte line, just call your nearest Wyandotte Representative or write direct to:

WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN
SERVICE REPRESENTATIVES IN 88 CITIES

Wyandotte
REG. U. S. PAT. OFF.

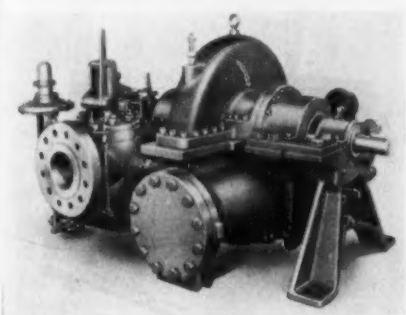
chine does not have to be dismantled to install new bearings; Sabeco split washers are slipped over the shaft and locked with the



safety key. Made of Sabeco bronze, the washers are made-to-order to specification. *Saginaw Bearing Co. For more information, check No. 45 on the postcard on p. 37.*

Single Stage Turbine

A standard single-stage turbine designed especially for high pressures uses all labyrinth shaft sealing. Initial pressures are to 1450 psig, initial temperatures to 950 Ftt, and back pressures to 300



psig. Seals consist of a series of shaft grooves and mating tongues of stainless steel packing. The number of labyrinths in the shaft depends upon the exhaust pressure rating. To provide for extreme thermal expansion, the turbine is supported at the true centerline and the front end is mounted on a flexible channel. The turbine is made in three sizes for capacities up to 2000 hp. *De Laval Steam Turbine Co. For more information, check No. 46 on the postcard on p. 37.*

Resume Your Reading on Page 41

Here is a *NEW* Carpenter Chrome-Nickel STAINLESS STEEL

that Does Things the 18-8's Can't Do!

Its *slow rate of work-hardening* solves fabricating problems frequently encountered with 18-8 type Stainless—

This new Stainless, invented in Carpenter's laboratories, work-hardens much *slower* than the regular 18-8 types. *Carpenter Stainless No. 10* is a Chrome-Nickel austenitic Stainless, ideal for cold headed fastenings such as recessed head screws. Also for the first time, Chrome-Nickel nuts have been produced commercially on automatic nut-making machines.

Carpenter Stainless No. 10 can be cold worked much easier than Type 302 Stainless. This makes it an ideal selection for parts that require severe coining or extrusion.

The corrosion resistance of Carpenter Stainless No. 10 is equal to or slightly better than that of the 18-8 types. It resists nitric acid well, sulphuric acid moderately.

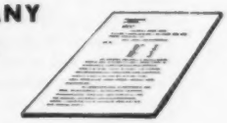
Forms commercially available include: wire and wire rods, cold drawn and ground bars, hot rolled bars and forgings, and forging billets.

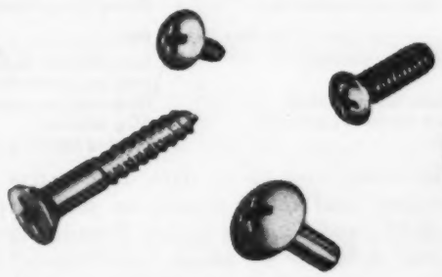
Engineering Data Sheets are Now Available

These Carpenter Stainless No. 10 data sheets contain information on tensile properties after cold working, corrosion resistance, thermal expansion and electrical characteristics, etc. For your No. 10 data sheets, drop us a note on your company letterhead.

THE CARPENTER STEEL COMPANY
121 W. Bern Street, Reading, Pa.

Export Department: 233 Broadway,
New York 7, N. Y. "CARSTEELCO"





Another Carpenter First!

Carpenter

more than corrosion resistance

STAINLESS NO. 10

(Patent Pending)

FOR COLD HEADED AND UPSET PARTS

Type Analysis: Carbon . . . 0.08% max. Chromium . . . 16.00% Nickel . . . 18.00%

TWO NEW R-C BULLETINS

for smaller volume, moderate pressure applications

If you are handling gas or air for any of the purposes listed below, or for similar applications, you need these two new bulletins on R-C Rotary Positive AF Blowers and XA Gas Pumps.

1. Air for combustion with oil or gas burners, small cupolas, coke-fired forges, etc., in:

- Iron and steel works
- Food processing industries
- Neon sign shops
- Chemical processes
- Nonferrous foundries
- Asphalt heaters
- Smelters
- Oil-fired forges
- Bakeries
- Ceramic, brick and tile mills

2. Aerating and agitating liquids, in:

- Ice plants
- Sewage and industrial waste disposal
- Electroplating, engraving and electrotyping
- Fish tanks or trucks, also shallow lakes
- Oyster washing
- Water treatment
- Protecting dams from ice
- Fruit, vegetable and poultry washing and cooling
- Blending vinegar, fruit juices, etc.
- Compounding oils

3. Miscellaneous pressure or suction uses:

- Pneumatic conveying of grains, insulation and liquids
- Rock dusting in mines
- Dust collecting systems
- Low pressure sandblast
- Respirators and safety helmets
- Testing rubber balloons, etc.
- Cleaning forging dies, motors and machines
- Boosting inlet pressure of compressors
- Drying barrels and drums
- Blowing cake off filters
- Air seal for bearings of rock crushers, etc.
- Pneumatically controlled valves
- Steam garment presses
- Printing presses
- Paper folding machines
- Vacuum chucks
- Drying yarns, textiles, etc.

4. Gas Pumps for:

- Boosting fuel supply to industrial furnaces
- Chemical processes and refineries
- Boosting pressure from small gas wells
- Neon sign shops
- Gas sampling equipment
- Inert gas generators
- Exhausting oil vapors
- CO_2 collectors
- Boosting supply to gas engines

These bulletins bring you up to date on construction, capacities, regulation, control and other details on R-C Type AF Blowers (Bulletin 21-B-37) and Type XA Gas Pumps (Bulletin 31-B-17). Send for them or write us about your needs, for engineering analysis, without obligation.

ROOTS-CONNERSVILLE BLOWER CORPORATION
503 Ohio Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE
BLOWER BUILDERS R-C SINCE 1854
ONE OF THE DRESSER INDUSTRIES

American Israel Foundries Files Registration Statement

Washington — American Israel Foundries Corporation, New York, has filed a statement with the SEC seeking registration of 5,000 shares of common capital stock.

The stock is to be offered for public sale, "as a speculation," for $100 per share. No underwriting is involved, the sale to be conducted by the officers and employees of the company.

The company was organized on January 30, 1950, for the purpose of constructing, equipping and operating a foundry for the manufacture of non-ferrous foundry products in the State of Israel. Proceeds of the stock sale would be used for the acquisition of land, construction of foundry buildings, purchase, shipment and installation of equipment, purchase and shipment of raw materials, working capital and other general corporate purposes. The prospectus names Herman D. Moskowitz of Jersey City, N. J., as Chairman of the Board, and Paul Herzog of New York City, as President.

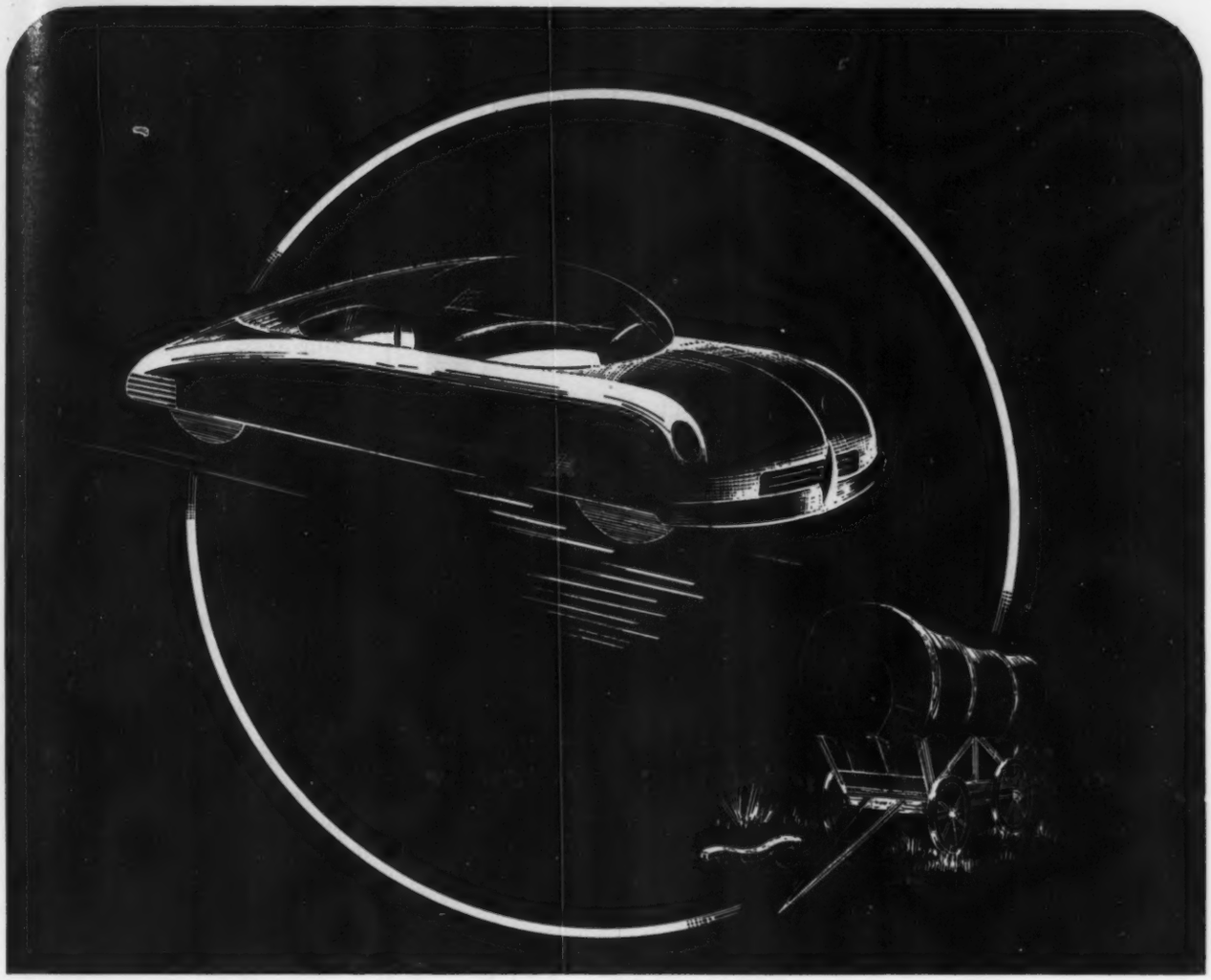
Film Boosts Free Enterprise

Detroit — A new colored slide film with sound developed especially to sell America's economic system to employees, schools and community groups has been released by Ross Roy, Inc., Detroit advertising agency.

According to Ross Roy, each film is based on historical facts and the presentation avoids the criticism of "big business" propaganda.

"This is not an attempt to change an individual's politics or right to think as he pleases. It is an attempt, however, to show all of us what we have in the way of a system for making a living, how we got it, and why it is worth keeping," a Ross Roy spokesman stated.

The agency said it hoped to make it possible for small firms, with only a few hundred dollars to spend, to enjoy the same program that will be used by some of our largest corporations.



SINCE 1850

THE AUTOMOTIVE INDUSTRY

in its advance from canvas-covered freighters to ultra-modern streamlined passenger cars, has been paced by the production and transportation of the necessary ores. The Cliffs organization is geared to meet the ore needs of the future as adequately as it has met those of the past ninety-eight years.

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VESSEL TRANSPORTATION • COAL

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Rings and blanks of varying diameters produced by the CENTRI-DIE process. Shown as cast and rough-machined.

Lebanon

CENTRI-DIE TRADE-MARK Castings with

Superior Qualities... Important Advantages

● Only by the Lebanon CENTRI-DIE method can certain parts—cylindrical and circular—be satisfactorily formed.

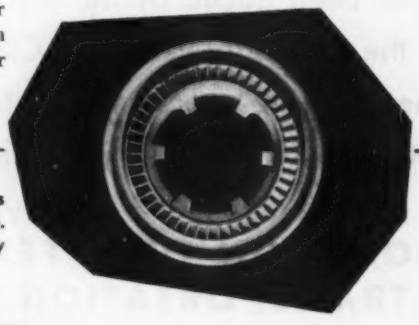
● Only by the CENTRI-DIE process can many of the new, special heat and corrosion resistant alloys—difficult to forge—be perfectly cast in permanent molds. *This one advantage has been of great importance in the production of this country's jet engines and other super-heat structures.*

● Only by the Lebanon CENTRI-DIE method do you get these superior physical properties: finer grain structure, greater density, easier machining, more uniform strength and directional properties.

● All CENTRI-DIE castings can be made to meet A.I.S.I., A.S.T.M., A.M.S. Army and Navy Specifications.

You will want to have all the facts on Lebanon CENTRI-DIE Castings . . . we invite you to write for our bulletin or bring your requirements to our engineers.

LEBANON STEEL FOUNDRY • LEBANON, PA.
"In the Lebanon Valley"



Lebanon also produces centrifugal castings in refractory molds—in any quantities. Illustration shows typical casting made by this process.

LEBANON ALLOY AND STEEL Castings

CIRCLE L

Stevens Institute Schedules Prestressed Concrete Course

New York—A course in prestressed concrete, unique because it marks the first time that this subject has been given as a full-term course in any school in the United States, is included in the spring term of Stevens Institute of Technology, Hoboken, N. J.

The course will cover the principles of prestressed concrete and methods of prestressing various types of structures; laboratory study of the properties of concrete and steel; the theory and design of simple and continuous beams, pipes and tanks; comparative design problems in reinforced concrete and in prestressed concrete, and construction procedures and the problem of cost.

Safety Award Received

Youngstown, Ohio — The tube scheduling and shipping department at the Campbell Works of Youngstown Sheet & Tube Co. has been awarded a bronze plaque for working 2 million man hours without a disabling injury.

During the period which began Mar. 10, 1944, the department shipped approximately 3 million tons of pipe—enough to circle the world more than seven times.

"This is an outstanding achievement," J. S. Stanier, general superintendent of flat rolled and tubular products at the plant, said in presenting the plaque to F. E. Swanson, foreman of the department. "Since 1925 we have had only one other department that has achieved this record."

New Metallurgy Course Offered

Philadelphia — Powder metallurgy will be the subject of a new lecture course to be given at Drexel Institute of Technology, Philadelphia, beginning Mar. 3. The course is being given primarily for the working engineers and technicians of this area.

Registration for the 12-lecture course, which will be given on consecutive Fridays, will be held during the week of February 27.

High Tensile steel spring wire shaped into lasting comfort for furniture

Foldabed, developed by No-sag Spring Co., Detroit.

YOUNGSTOWN Buckeye high carbon (MB-equivalent) basic steel spring wire goes into many of the high tensile springs, so popular now for upholstered chairs, divans, automobile seats and sleeping car berths.

Youngstown Buckeye high carbon basic steel spring wire, supplied for this and other types of special springs, is produced in gauge, temper and carbon content to meet the fabricator's specifications. It runs true and uniform in strength, ductility and other wanted characteristics, with proper balance in stiffness and workability to produce just the right degree of lasting comfort in the finished spring, without breaking or failure in fabricating operations.

Youngstown Buckeye high carbon basic spring wire is now available in a wide range of grades. Write or phone our nearest District Office.

Youngstown

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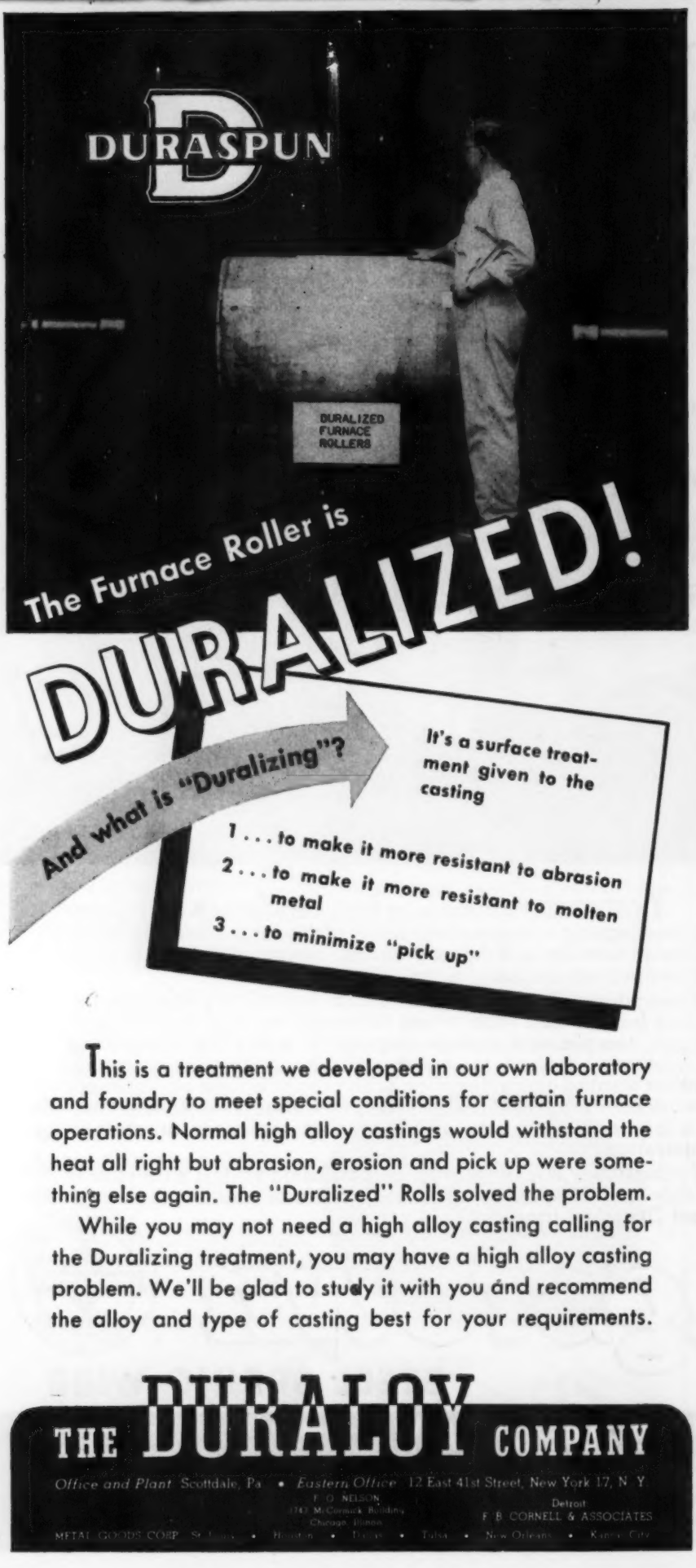
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DURALIZED FURNACE ROLLERS
The Furnace Roller is
DURALIZED!
And what is "Duralizing"?
It's a surface treatment given to the casting
1 . . . to make it more resistant to abrasion
2 . . . to make it more resistant to molten metal
3 . . . to minimize "pick up"

This is a treatment we developed in our own laboratory and foundry to meet special conditions for certain furnace operations. Normal high alloy castings would withstand the heat all right but abrasion, erosion and pick up were something else again. The "Duralized" Rolls solved the problem.

While you may not need a high alloy casting calling for the Duralizing treatment, you may have a high alloy casting problem. We'll be glad to study it with you and recommend the alloy and type of casting best for your requirements.

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Urges Business Men to Press Fight Against Statism

New York—American business men are losing the fight against "statism." That was the opinion expressed by Herman W. Steinkraus, chairman of the board of the Bridgeport Brass Co. and president of the Chamber of Commerce of the United States, when he spoke before the National Sales Executives at the Waldorf-Astoria last week.

Even with the world's best sales talent, business has no overall spokesmen to bring its story before the American public, Mr. Steinkraus declared, adding that the three largest unions in the country have budgets running into hundreds of millions of dollars and speak for 15,000,000 workers.

Mr. Steinkraus explained that The U. S. Chamber of Commerce, although it represents 2500 local chambers and 600 trade associations, has a budget of $2,500,000 divided up into eighteen departments. Only a small part of these funds can be devoted to publicity, he pointed out.

Intensive research has proven that Americans are interested in one thing above all others, namely their jobs. This is the handle which business must grasp to get across the idea that the American way of life and all jobs depend on active trade, industry and agriculture, Mr. Steinkraus stated.

A recent public opinion poll indicated that only 7 pct of the people have the idea that business has done the most for their welfare. Forty-nine per cent said that Government had done the most and 43 pct voted for unions as their greatest benefactor, he added.

PMI to Discuss Work Methods

Chicago—"Work Simplification In Metal Stamping Plants" will be the subject of a panel discussion before the Chicago chapter of the Pressed Metal Institute at a dinner meeting Mar. 8 at the Graemere Hotel.

Allen H. Mogensen, director, Work Simplification Conference,

Extra Dividends with CLEVELANDS

From experience, production managers know that Cleveland Presses give years and years of profitable trouble-free operation. You call this kind of a press a work horse. Above at the Bettcher Manufacturing Company of Cleveland, Ohio, you see a Cleveland 2-84-250 Press making the first form on two automotive body sections. Another Cleveland has already done the blanking while the third Cleveland is making the final form in this press production line.

In emergency cases these Clevelands have been called on to handle forming jobs requiring more than rated capacities. Though this is not the usual practice at the Bettcher plant, it has enabled them to handle many jobs that otherwise would have been impossible. The sound engineering and tested design that stands behind every Cleveland Press has paid off again.

Reserve capacity is only one of the *extra dividends* you can expect from your investment in a Cleveland Press. "Besides its extreme ruggedness you can also count on continuous accuracy and minimum maintenance with Clevelands," says Mr. Clarence H. Lange, plant superintendent at Bettcher.

Be sure to investigate the advantages offered by the complete line of Cleveland Presses. Standard presses can be furnished in a wide range of sizes and capacities in ten different types. A special Cleveland Press can be designed for your exact requirements. A-2767

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OFFICES AT: NEW YORK . . . CHICAGO DETROIT . . . PHILADELPHIA PITTSBURGH

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Please send me your new catalog containing full data on the complete line of Blake & Johnson fastenings.

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Lake Placid, N. Y., will serve as chairman of the question and answer technical session. Other members of the panel will be Russell Anderson, Webster Electric Co., Racine, Wis.; James Lunsford, International Register Co., Chicago; and James Perkins, Uniform Printing & Supply Co., Chicago.

Canadian Pig Iron Output Passes Former All Time High

Toronto — Canadian pig iron production in December, 1949, amounted to 172,002 net tons for a daily average rate of 73.7 pct. of total rated capacity and compares with 174,233 tons or 74.7 pct. for December, 1948. For the month under review output included 130,851 tons of basic iron; 20,950 tons of foundry iron and 5,526 tons of malleable iron.

For the year 1949 pig iron production totalled 2,154,352 net tons. This is a new all time record for Canada, and compares with 2,120,909 tons for 1948.

Output for 1949 included 1,790,223 tons of basic pig iron; 215,496 tons of foundry iron and 148,633 tons of malleable iron.

Production of ferro-alloys in December amounted to 11,853 net tons compared with 23,708 tons in December, 1948. For December last year output included by tonnage, ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-x and ferrophosphorus.

For the full year 1949 output of ferro-alloys totaled 211,603 net tons a decline from the high record of 250,659 tons in 1948.

Comparative monthly production figures for pig iron and ferro-alloys for 1949. (net tons)

1949	PIG IRON	FERRO-ALLOYS
January	183,074	21,931
February	172,724	21,713
March	202,130	22,457
April	180,740	24,427
May	202,148	20,652
June	194,255	19,264
July	175,381	14,280
August	180,115	12,562
September	168,436	12,250
October	166,020	15,456
November	157,327	14,758
December	172,002	11,853
Total 12 Months	2,154,352	211,603

J&L Sets Up Salaried Employees Insurance Plan

Pittsburgh—A voluntary social insurance program for salaried employees was put into effect Mar. 1 by Jones & Laughlin Steel Corp.

The program, underwritten by Metropolitan Life Insurance Co., calls for life insurance ranging from $2500 to $20,000, depending on the salary of the employee; accidental death and dismemberment insurance ranging from $1250 to $10,000; weekly sickness and accident benefits of from $25 to $100; surgical benefits of $200 maximum, and daily hospital benefits of $8, plus benefits of $120 maximum for special services.

Employees' monthly contributions range from $2.70 to $14.40, with the company making up the difference between the net cost of the program and the fixed amount paid by the employees.

Includes Hospital Insurance

Hospital expanse and surgical operation insurance is available for employees who desire it. The cost per month for an employee with one dependent is $3.15; for two or more dependents, $3.85. Dependent coverage includes daily hospital benefits of $8 plus benefits for special services, and up to $200 for surgical services.

Life insurance coverage for a retired employee is limited to $1250, or 30 pct of the amount carried prior to retirement, whichever is greater, without expense to him; and he may continue social insurance coverage for himself and dependents by paying the specified charge for these services.

Buick Sales Exceed Production

Detroit—Despite record production during the month of February, sales of 1950 Buick models have exceeded car assemblies at the Buick plant. Ivan L. Wiles, general manager, has disclosed that February production hit 35,800, bringing the total number of cars assembled this year to 74,000.

This is an increase of 23 pct over 1949. Sales for the second ten days in February were 30 pct above last year's.

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You Save Rewelding Costs by Using Arcos Stainless and Low-Alloy, High-Tensile Electrodes

Arcos electrodes give you good, high quality welds, day after day, without the need for chipping and rewelding. That is because of the many rigid quality control inspections made during manufacture. And you can always pick the right electrode to give you the results you want from Arcos' complete line.

Arcos manufacturing processes are geared to the production of high quality electrodes to meet the exacting requirements of welding stainless and low-alloy, high-tensile steels, as well as non-ferrous metals.

Try an Arcos electrode on your next stainless or alloy welding job and measure your savings in less rewelding. All standard types and sizes available from near-by distributor stocks.

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HELIWELDING boosts auto fender production

A prominent automobile manufacturer found it difficult to give sheet metal the deep draw required by new styling. Assemblies such as fenders, drawn from one metal sheet, resulted in distortion and excessive splitting, even when drawn hot. Because of this, the manufacturer turned to stamped and welded body sections – however, many welding techniques were tried and were found to be unsatisfactory.

R. E. Ferris and C. E. Tromp, Airco representatives, were consulted, and recommended Airco's Heliwelding processing. It proved most practical, both from the speed and finishing standpoint – there was no distortion of the .042″ sheet metal used. The photograph illustrates the Heliwelding of two stampings of the fender at a speed of 13″ per minute, using Airco No. 1 Alloy Rod to insure freedom from porosity and pinholes in the weld metal.

• • •

If you are interested in applying the Heliwelding process to a particular fabrication problem of your own, you will find some helpful hints contained in the pages of Bulletin ADC-709. Please address your nearest Airco office for a copy.

AIRCO **AIR REDUCTION**
Offices in Principal Cities

TECHNICAL SALES SERVICE—ANOTHER AIRCO PLUS-VALUE FOR CUSTOMERS

Steel Ingot Production Reaches New High in Canada

Toronto — Canadian production of steel ingots and castings for December amounted to 263,949 net tons for daily average of 77.4 pct. of rated capacity. This compares with 259,722 tons in November when the rate was 78.7 pct., and with 280,425 tons in December, 1948 when the average was 87 pct. of capacity. Output for December included 257,883 tons of steel ingots and 6,066 tons of steel castings.

For the full year, 1949, production of steel ingots and castings totaled 3,186,930 net tons of which 3,089,368 tons were steel ingots, a new record for Canada, and 97,562 tons of steel castings. For 1948 production totaled 3,201,656 net tons including 3,089,027 tons of steel ingots and 112,629 tons of steel castings.

Comparative monthly production figures for steel ingots and castings for 1949. (net tons)

1949	STEEL INGOTS	STEEL CASTINGS
January	275,987	8,720
February	249,009	10,272
March	287,885	10,576
April	260,319	9,649
May	283,808	9,371
June	261,476	8,979
July	232,499	6,331
August	241,442	7,307
September	232,882	7,866
October	252,965	5,926
November	253,213	6,509
December	257,883	6,066
Total 12 Months	3,089,368	97,562

National Steel Raises Dividend

Pittsburgh — National Steel Corp. stockholders will vote at a special meeting, to be held soon, on a proposal to split capital stock of the company on a three-for-one basis.

The decision to submit the proposal was made by the board of directors at a meeting at which a dividend of $1.50 per share was declared for the first quarter of 1950—an increase of 25¢ on the dividend rate paid in previous quarters. It is payable Mar. 13 to stockholders of record Mar. 3.

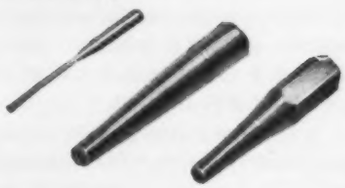
toughen metal

improve surface

end stock waste

with

TORRINGTON SWAGERS



The Torrington Rotary Swaging Machine delivers 4000 hammer blows a minute...reduces, sizes, rounds, points and tapers rod, wire and tubing . . . work-hardens metal for toughness and resilience...produces a burnished surface . . . utilizes every bit of stock.

Torrington Swager performance is based on our 42 years of swaging experience. Send the coupon for your free copy of the booklet illustrating the machines and describing the art of rotary swaging.

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Trane Co. 1949 Sales Set Record, But Profit Declines

LaCrosse, Wis. — Though 1949 sales set a record level, profit of the Trane Co. declined last year to $5.69 a share from $6.11 a share in 1948.

The boom in air conditioning has resulted in constantly increasing sales, but production expenses and cost of goods sold have also risen, the company's annual report said. The company expended $801,470 on capital improvements in 1949, and expects to further expand this year as new products are introduced.

Urges Proper Care of Metals

Cincinnati—Increased iron and steel costs coupled with higher installation and maintenance charges make it necessary to protect these metals properly. The best method of conservation, according to F. C. Brightly, retiring president of the American Hot Dip Galvanizing Assn., is the age old molten zinc still.

Mr. Brightly conveyed this information to members of the association at the opening session of its two-day annual meeting held here recently.

R. E. Byrd, Atlantic Steel Co., Atlanta, succeeded Mr. Brightly as president of the association. C. L. Moorman, Equipment Steel Products Co., was elected first vice president and J. D. Tate, Witt Cornice Co., Cincinnati, was elected second vice president.

O'Brien Moves Sales Office

Philadelphia—The O'Brien Machinery Co. will move its sales offices on May 1st to the company's new plant at 1545 North Delaware Ave. The plant, used for rebuilding, manufacturing and warehousing, contains 100,000 sq ft of floor space. It is considered to be one of the largest machinery warehouses in the East. Until that time the company's offices will remain at 113 North Third St., Philadelphia 6.

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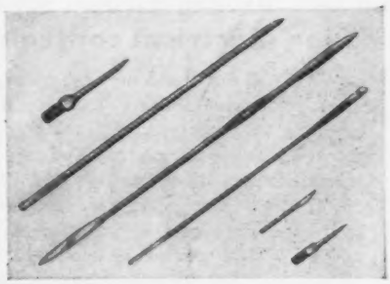

Special equipment and volume production enable us to make precision parts for you at much lower costs.

For example, highest quality special needles for textile, leather, paper, etc., machinery. Pins for printing presses and surveyors' instruments. Special equipment assures proper heat-treatment . . . accurately formed eyes, grooves and shanks . . . precisely sharpened points . . . clean milling, knurling, slotting, and bevelling. Needles hand-straightened.

Send your prints and specifications today for a prompt quotation, and ask for a copy of "Precision Metal Parts".

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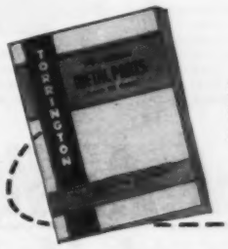

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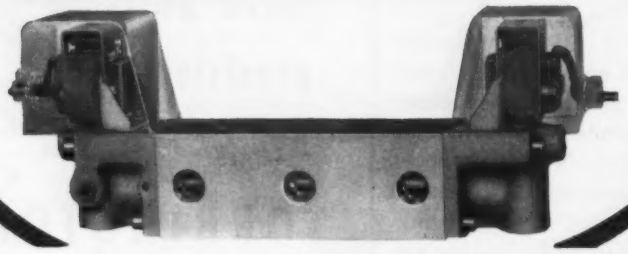

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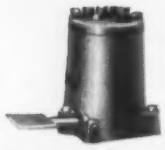
▶ simpler electrical controls — high air economy...

● Small solenoids traveling through only a ⅛" stroke move small pilot valve plungers to apply air to operating pistons that move the main valve plunger back and forth. All operating parts are rugged, yet weigh only a few ounces. Reduced amperage eliminates intermediate relays, simplifying control circuits. Positive high cycle operation, without destructive impact, reduces maintenance and minimizes trouble due to voltage variations. ⅜" to 2" sizes. 2, 3, and 4-way actions. Solenoid control both directions or automatic return in one direction.

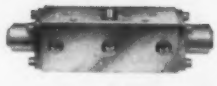
Send for Data Sheet No. 1611. It gives full details.

Individual DATA SHEETS for Each Valve — give complete details. Write today!

Hand Operated Air Valves—wide variety of uses. 2-way, 3-way, 4-way neutral position and compound exhaust.

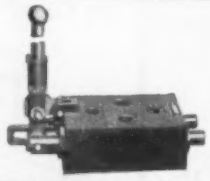


Foot Operated Air Valves—workman has both hands free, speeding production. 2-way, 3-way and 4-way actions.



Single Plunger Valves—for air or low pressure hydraulic service. Lever, pilot, cam, diaphragm or solenoid operated. 2-way, 3-way, 4-way actions.

Series "O" and "OE" Valves—for air or hydraulic service up to 125 PSI. Push-pull, cam, pilot, diaphragm and solenoid operated. ⅛" and ¼" pipe connections. 2-way, 3-way, 4-way and 5-way actions.



Hydraulic Valves—Up to 5000 PSI. Conservatively rated. ½", ¾", 1" and 1½" sizes. 2-way, 3-way, 4-way actions.

Hydraulic Valves—Up to 5000 PSI. Pilot cylinder operated. ½", ¾", 1", 1½", 2", 2½", 3" and 4" sizes. 2-way, 3-way, 4-way actions.

Quick-As-Wink Control Valves

THE HIGHER THE PRESSURE • THE TIGHTER THE SEAL •

Manufactured by C. B. HUNT & SON, Inc.

1912 East Pershing Street, Salem, Ohio

GSA Offers Industrial Plants Under Relaxed Security Clause

Washington—Ten iron and steel plants, 13 metal works, seven aircraft factories, and 26 other idle industrial reserve facilities are now offered by the General Service Administration to private industry under a greatly relaxed security clause.

The properties are valued at $733 million. They are offered under "more attractive" terms for two major reasons—better maintenance if kept operating, and reduced maintenance cost to the government.

Industrial reserve property management is presently costing upwards of $12.5 million. This is expected to be reduced next year to about $10 million.

A major change in security leasing now provides for reimbursement if a plant is recalled. Also, the peacetime operator is given option to continue operation for defense should the plant be recalled.

Buyer Can Make Alterations

Another revision permits a renter or buyer to make any desired alterations so long as these do not prohibit reconversion to war capacity within 60 days (and the whole plant within 120 days).

Still another change relieves the private operator of much of the responsibility for maintenance of unused and stored equipment. Specific agreements are made.

Included among the plants now offered under the changes are:

Iron and steel: Columbia Steel Co., Pittsburgh; Gary Armor Plate Plant, Gary; Aluminum Forgings, Inc., Erie; American Steel Foundries Co., Indiana Harbor; Champion Machine & Forging Co., Cleveland; Continental Foundry & Machine Co., Coraopolis; Heppenstall-Eddystone Corp., Eddystone (Pa.); Ohio Steel Foundry Co., Lima; Timken Steel Foundry Co., Melvindale (Mich.); and United Engineering & Foundry Co., New Castle.

Nonferrous: Aluminum Co. of America plants at Riverbank, Calif., Glassmere, Pa., and Burlington, N. J.; Revere Copper & Brass Co., Halethorpe, (Md.); Permanente Metals Corp., Manteca (Calif.); Nicaro Nickel Co., Cuba; New England Lime Co., Canaan (Conn.); Electro-Metallurgical Co., Spokane; Dow Magnesium Co., Velasco, Tex. and Bay City, Mich.; Diamond Magnesium Corp., Painesville; Domes-

tic Manganese & Development Co., Butte; and Amco Magnesium Corp., Wingdale, N. Y.

Aircraft: Boeing Aircraft Corp., Renton; Columbia Aircraft Corp., Valley Stream, (L. I.); Curtiss-Wright Corp., Kenmore (N. Y.); Globe Aircraft Corp., Fort Worth; Southern Aircraft Corp., Garland (Tex.); Chrysler Corp., (formerly leased to the Tucker Corp.) Chicago; and General Motors Corp., Tonawanda.

Included in the remaining 26 properties are the Consolidated Steel Corp., Los Angeles, and Chicago Bridge & Iron Co., Seneca, both shipbuilding; Standard Steel Spring Co., Madison (Ill.) and Timken Detroit Axle Co., Detroit, both motorized vehicles; and Ohio Ordinance Works, Henderson, Ky., chemicals.

Scrap Inst. Makes Safety Awards

Seattle—Washington state members of the Institute of Scrap Iron and Steel take safety seriously. Last week the Pacific Northwest Chapter awarded a plaque for excellence in safety ratings to the Pacific Iron & Metal Co., of Seattle, in the class of more than 10 employees, and a rotating plaque to three companies with fewer than 10 employees who tied for the honor: Bellingham Iron and Metal Co., Bellingham, Wash.; Levey Machinery Co., Everett, Wash.; and B. Radinsky & Son, Seattle.

Individual employees without time lost accidents chargeable against them were awarded gold pins. Harry Schwartz, chairman of the safety committee for the local chapter and a principal in the Alaska Junk Co. of this city, developed this program with the assistance of the State Industrial Insurance Dept.

U. S. Steel Supply Named Agent

Chicago — The United States Steel Supply Co. has been appointed a distributor for two new electric arc welders' products manufactured by Industrial Overlay Metals, Inc.

Dimaloy coated tungsten carbide tubes, one of the new products, are packed with 96 pct pure tungsten carbide, without use of a binder. The unfilled Dimaloy tubes may be filled with a variety of carbides of the operator's choice, or alloy deposits may be made by inserting rods of cast iron, copper, manganese or various steels.

A Detroit foundry saves thousands of dollars each year on cylinder head castings weighing about 125 pounds. Another foundry, after long experience, states, "In all cases a definite improvement was noted if the molding procedure included the use of AlSiMag Strainer Cores." Improved quality, fewer rejects, have added materially to their profits.

Perhaps you, too, can find new profits by using AlSiMag Strainer Cores. They are custom-made for your requirements. They are strong, hard, flat, rigid . . . stand up under fast, rough handling. These AlSiMag Strainer Cores are not affected by molten metal temperatures normal to foundries. You get faster production and a higher percentage of perfect, smooth castings.

FREE SAMPLES ON REQUEST

Samples of AlSiMag Strainer Cores from sizes in stock are sent free on request. Test samples made to your specifications at reasonable cost. Write for samples. Test them in your own foundry. Keep a record of the results. You will see, as other foundries have, that AlSiMag Strainer Cores pay for themselves many times over.

AMERICAN LAVA CORPORATION

49TH YEAR OF CERAMIC LEADERSHIP

CHATTANOOGA 5, TENNESSEE

Offices: METROPOLITAN AREA: 671 Broad Street, Newark, New Jersey, Mitchell 2-8159 • CHICAGO, 9 South Clinton Street, Central 6-1721 • PHILADELPHIA, 1649 North Broad Street, Stevenson 4-2823 • LOS ANGELES, 232 South Hill Street, Mutual 9076 • NEW ENGLAND, 38-B Brattle Street, Cambridge, Massachusetts, Kirkland 7-4498 • ST. LOUIS, 1123 Washington Avenue, Garfield 4959

Appraisal of Uranium Find Awaits Tests

Hunch of Jones & Laughlin geologist pays off . . . But extent of the find will be proven by spring drilling.

Pittsburgh—L. P. Barrett, chief geologist of Jones & Laughlin Steel Corp., will know next spring whether his hunch will pay off in a really important domestic source of uranium ore for the United States.

Found by College Instructor

Last week's announcement that J. & L.'s Jalore Mining Co., Ltd., had found uranium ore in the north woods of Michigan was a public confirmation of Mr. Barrett's faith that a uranium-bearing formation found on the Canadian side of Lake Superior late in 1948 extended to the American side.

After the 1948 discovery at Theano Point north of Sault Ste. Marie, Ont., Mr. Barrett equipped his field parties with Geiger Counters, with directions on where to prospect. The area is more than familiar to Mr. Barrett, who worked it for the State of Michigan as early as 1910, when uranium was less important than today.

The new discovery was made last August by Eiler Henrickson, an instructor at Carleton College, Northfield, Minn., who was employed by J. & L. during the summer months. The bed is in outcroppings on the Huron River in Baraga County.

The Atomic Energy Commission already has confirmed the presence of pitchblende, which contains uranium, from samples submitted by J. & L. Drill testings scheduled for next spring will determine extent of the find, the first of its kind in the Midwest, and one of the first in the country. Only other uranium-bearing ores generally known are secondary low-grade Carnotite ores in Colorado.

Strong Hope for U. S. Sources

This country has been dependent on Canadian discoveries at Great Bear Lake and Lake Athabaska, and the Belgian Congo for its supplies of the vital ore. The hope, of course, is that the Michigan lode will serve to make the U. S. less dependent on outside sources.

J. & L. has an option on 80 acres of state-owned land around the discovery, and has obtained exploration rights from the Ford Motor Co. on land owned by Ford. The Michigan Conservation Commission will act Jan. 13 on the steel company's application for a lease.

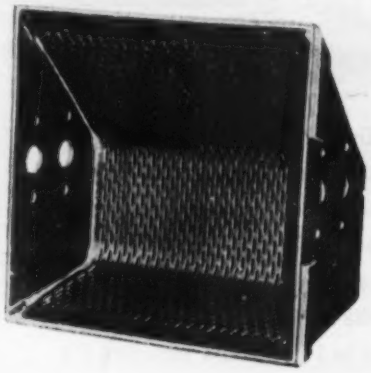
AFS Schedules Future Meetings

Los Angeles—Future meetings of the Southern California Chapter of the American Foundrymen's Society promise to offer the members varied and interesting information.

On Mar. 10, R. A. Quadt, research metallurgist and director of aluminum development, Federated Metals Div. of the American Smelting and Refining Co., will speak on aluminum alloy castings. Following the lecture a motion picture, "Behavior of Molding Sands at Elevated Temperatures," will be shown through the courtesy of the Harry W. Dietert Co.

A series of lectures on sand control will be delivered from Mar. 13 to 16 by Harry W. Dietert at the U. of Southern Calif. On Mar. 14, L. P. Robinson of the Werner G. Smith Co. will discuss cutting costs in the core room. The Naval Research Laboratory will show motion pictures on gating systems for metal castings, finger gating and step gating.

Typical of Hendrick's Manufacturing Facilities



Hendrick is exceptionally well equipped to manufacture to specifications a wide range of metal products that involve such operations as perforating, shaping, forming, welding, brazing, riveting, etc. The perforated elevator bucket illustrated is typical of the many specialized articles for whose fabrication Hendrick has unusual facilities. Write in detail regarding any metal product you desire fabricated.

SEE OUR CATALOG IN SWEET'S

HENDRICK
Manufacturing Company
37 DUNDAFF STREET, CARBONDALE, PENNA.
Sales Offices In Principal Cities

Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

Steel Companies Sign Up For Blue Cross Insurance

Pittsburgh—The Hospital Service Association of Pittsburgh and district steel companies have signed agreements providing for Blue Cross hospitalization coverage for some 900,000 persons.

Agreements were reached with U. S. Steel Corp., Jones & Laughlin Steel Corp., Sharon Steel Corp. and smaller firms. A contract was announced recently for Bethlehem Steel Corp. employees.

The agreements cover benefits agreed to between the companies and the CIO United Steelworkers of America for workers coming under the union contract. Cost is to be shared by the companies and employees.

Superior Steel Reports Loss

Pittsburgh—Superior Steel Corp. reported a net loss of $672,229, or $2.40 a share, for 1949, but C. I. Collins, president, told stockholders that orders on hand are sufficient to support near-capacity operations into May.

Mr. Collins said the loss for last year was due to two things: (1) return to competitive selling in the steel industry, and (2) the expense of putting a new hot-rolled strip mill in operation.

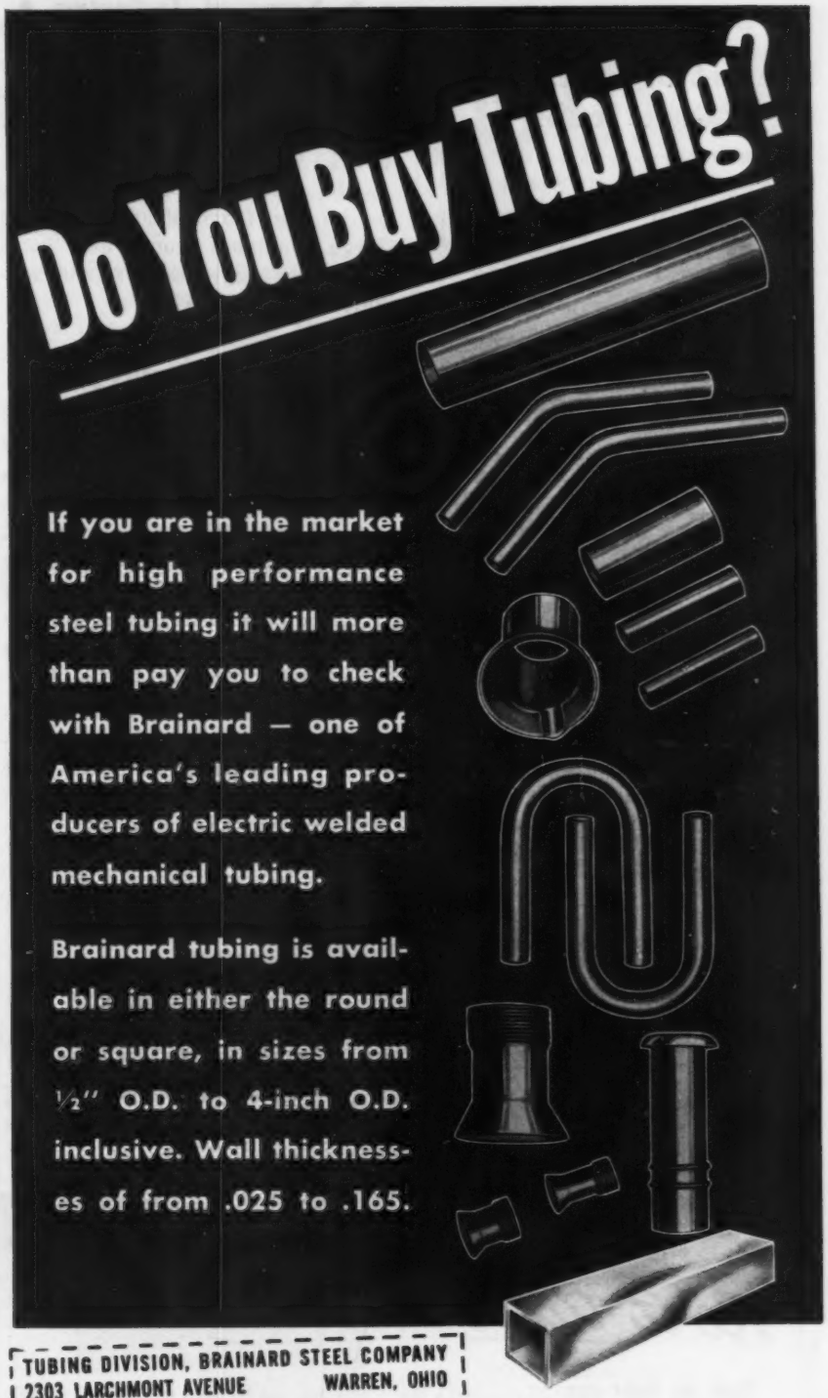
Net sales in 1949 were $13,395,444, compared with $18,824,378 for 1948. The loss of last year compared with a profit of $966,319 in 1948.

January Retail Sales Rise

Washington—Automotive sales, up a third from 1949, were primarily responsible for holding January retailing business above levels of both December and January a year ago.

Allowing for seasonal and trading day factors, the Dept. of Commerce says, January retail sales of $9.5 billion were 3 pct above December and 2 pct over January 1948.

Most categories of durables showed less than usual seasonal declines for the month. Building materials and hardware groups showed a slight increase.


Do You Buy Tubing?
If you are in the market for high performance steel tubing it will more than pay you to check with Brainard — one of America's leading producers of electric welded mechanical tubing.
Brainard tubing is available in either the round or square, in sizes from ½" O.D. to 4-inch O.D. inclusive. Wall thicknesses of from .025 to .165.
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Please send me information regarding Brainard tubing.
Name
Title
Company
Address
City State
SHARONSTEEL
TUBING DIVISION
BRAINARD STEEL COMPANY
2314 LARCHMONT AVE., WARREN, OHIO

Universal-Cyclops Gives Nod to Employee Pension

Pittsburgh—Stockholders of Universal-Cyclops Steel Corp. have approved an employee pension plan covering 2400 workers, effective Mar. 1.

The pension agreement was negotiated last November by the company and the CIO United Steelworkers of America.

Chrysler Marks Record Year

Detroit—The Chrysler Corp. had an all-time record of production, sales and earnings during 1949.

Official production totals show 1,267,470 vehicles produced in the United States and net sales of all products of $2,084,602,547. Net earnings of $132,170,096.

Excluding foreign dividends, earnings were 5.71¢ for each dollar of sales compared with 5.69¢ in 1948. K. T. Keller, president of Chrysler, explained that total taxes of all kinds amounted to $213,885,704 or 61.2 pct of $349,479,472 paid in wages and salaries.

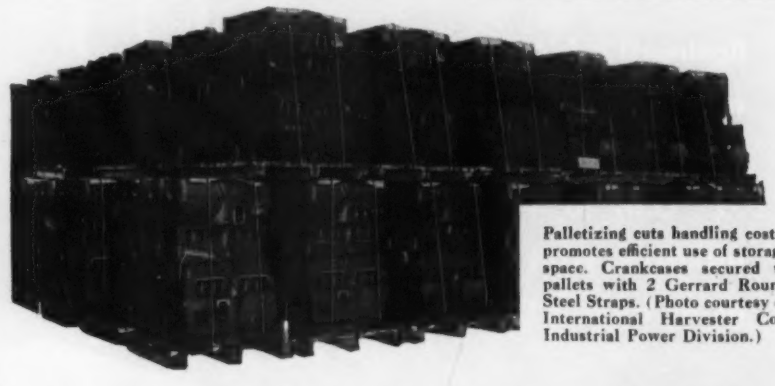
The report shows that Chrysler is buying from 6500 small and large business concerns. Total purchases aggregated $1,336,281,897, the report said.

Eaton Mfg. Co.'s Profits Drop

Cleveland—Eaton Mfg. Co. and subsidiaries report a net profit for 1949 of $8,259,530, compared with net profit of $10,971,106 for 1948.

Sales for 1949 were $102,227,612, compared with $128,132,677 for 1948. The lower volume of sales in 1949 is attributed largely to decreased demand on the part of truck builders.

Limited production at the company's new plant in London, Ontario, was started on Feb. 8. It is expected that full production will be reached about March 15.



Palletizing cuts handling costs, promotes efficient use of storage space. Crankcases secured to pallets with 2 Gerrard Round Steel Straps. (Photo courtesy of International Harvester Co., Industrial Power Division.)

Tie it tight...that means GERRARD!

Tight as tight can be... that's the kind of tie you get when you use the Gerrard method of strapping. Gerrard Steel Strapping is *round* . . . that's why it clinches evenly at the corners and distributes the stress evenly through its diameter. Danger of breakage . . . and damage claims, too . . . are sharply reduced. Individual packages and palletized units remain firm from plant to destination.

Gerrard Machines and Strapping, in a wide range of sizes, can be used to tie small parcel post packages, heavy pallets or carload lots of steel pipe, plate and tinplate.

And Gerrard Round Steel Strapping costs about 40% less than any other metal reinforcement.

Write for a *free* copy of *Blue Book of Packaging*. And consult a Gerrard engineer about your packaging problems. His services are available free of charge.

Gerrard Steel Strapping Company, 4705 South Richmond Street, Chicago 32, Illinois.

USS GERRARD ROUND STEEL STRAPPING

UNITED STATES STEEL

ECA Aids Development Of Turkish Lignite Mine Project

Washington — A supplemental allocation of nearly $1.3 million in Marshall plan funds has been approved for completing development of three lignite mines in western Turkey.

A substantial portion of the ECA funds will be used for purchase of American machinery and equipment. This includes haulage and slope equipment, including conveyors, track and trolley supplies, as well as power equipment.

The mines are now in production. Last year, the ECA allocated $868,000 to begin development and local currency and Export-Import Bank funds have been used to construct two washeries, an aerial tramway, and two power generating stations.

Allegheny Ludlum Income Drops

Pittsburgh—Net earnings of Allegheny Ludlum Steel Corp. in 1949 were $1,976,323, compared with 1948 earnings of $6,833,384. The company said the decline was due to customer inventory reductions, the steel strike, and disruption of operations caused by installation of new and improved production facilities.

Sales last year were $105,734,721, compared with 1948 sales of $126,789,255. The board of directors declared a first quarter dividend of 50c on common stock, payable Mar. 31 to holders of record Mar. 1. With demand for stainless and other company products strong, major facilities are operating at capacity and will continue so through the second quarter.

Auto Assn. Post to Hufstader

Detroit—William F. Hufstader, vice-president in charge of distribution, General Motors Corp., has been elected chairman of the Sales Managers Committee of the Automobile Manufacturers Assn.

Mr. Hufstader succeeds former chairman Karl M. Greiner, vice-president in charge of sales for Packard Motor Car Co.

Aluminum Roofing Seen Here to Stay

Aluminum roofing first used as postwar substitute for scarce materials . . . Survey shows farmers like it . . . Producers invading commercial field—By KARL RANNELLS

Knoxville—Farmers expect to spend about $650 million this year for new construction and tens of millions more for repair and maintenance. Roofing business and aluminum firms expect a major share.

Ready acceptance of aluminum roofing came as a surprise, even to the industry. But since the war, shortages of other materials combined with a well-planned sales campaign have placed aluminum tops on more than 2.5 million major farm buildings—not counting such items as corncribs, or outhouses.

First Tried as Substitute

Postwar use of aluminum roofing is especially evident in the eastern and southern rural areas. Down through the Shenandoah Valley, and here in Tennessee, the Carolinas and other southern states, the farm without at least one or more aluminum-roofed buildings is a rarity.

And having tried it strictly as a postwar substitute, most farm users like it. They say they will continue to buy it when and as needed; such statements are backed by roofing sales which continue strong.

Proof of the current big roofing business lies in the sales records. The Aluminum Co. of America alone has sold upwards of 250 million lb of roofing to farmers since the war.

And Kaiser's Permanente Metals Corp., which did not get into the roofing field until the spring of 1947, has disposed of nearly 95 million lb to rural customers. Permanente roofing sales have been averaging about 2.5 million lb monthly.

These figures do not include sales for such purposes as the government grain storage program. It is estimated that Commodity Credit Corp. bought about 25 mil-

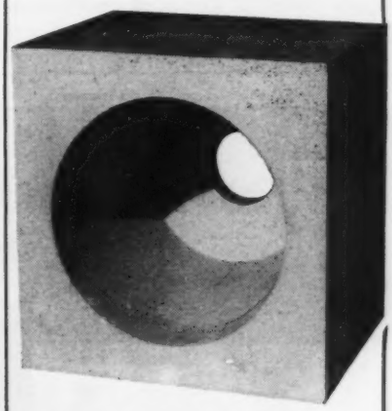
MECHANICAL KIDNEY: Manufacturer of the most widely diversified line of capital goods in the world, Allis-Chalmers Mfg. Co., Milwaukee, departed from its usual production to produce the mechanical kidney shown in the illustration. This unit is capable of replacing the functions of the human kidney for several hours where acute uremic poisoning exists. The mechanical kidney has been known to remove enough poison in 10 hr to permit the patient to live 8 or 10 days without further application of the machine.

MUL-8

A quality Mullite Refractory

Mul-8 contains a high percentage of Crystalline Mullite. Crystalline content has long been recognized as a controlling factor in the performance of mullite refractories.

PYROMETRIC CONE EQUIVALENT #38



BURNER BLOCKS and other shapes made to your specifications.

Standard shapes carried in stock.

Special shapes made to your specifications.

Dependable Refractories

REMMEY

RICHARD C. REMMEY SON CO.
Philadelphia 37, Pennsylvania

lion lb of roofing and sheet last year for grain bins. This agency has asked for about $90 million for this purpose in 1950.

Aluminum Men Dubious

Aluminum men were at first frankly dubious about the booming postwar demand, realizing that a lot of the heavy roofing sales stemmed from shortages of materials. They feared a bad letdown when tin and galvanized roofing again became more plentiful.

Last summer it looked as if that time had come. Not only roofing but overall aluminum sales slumped alarmingly. Commerce Dept. showed shipments of plate, sheet and strip down to 49 million lb in August—down 52 pct from the more than 100 million lb for the same month a year previously.

Seriously disturbed, Alcoa had a survey conducted among its roofing users. Results dispelled pessimism. It found that 83 pct of those contacted said they would again buy aluminum roofing, if needed.

Supporting these findings, sales of roofing and other aluminum were rising by early fall. Commerce Dept. figures for November showed shipments of sheet, strip and plate back to the 75 million lb mark.

Sales Campaign Pays Off

Preliminary year-end figures indicated that despite the heavy summer slump, which also affected business generally, the cumulative total for the year was only about 25 pct less than for the peak year of 1948.

High aluminum roofing sales since the war were only partially brought about by shortages of other materials. Alive to its opportunity, the industry has conducted a well-planned, highly pressurized sales campaign.

It has worked closely with farm bureaus, cooperatives and commercial retail outlets. Producers have supplied their distributors with a wealth of promotional and informational materials, sales instructions, window displays and so on.

Advertisements and salesmen have steadily plugged aluminum's fine points—lightness, flexibility, heat reflection and so on. Engineers have worked to develop cheaper and better products. And, for instance, because wire nails and aluminum do not go well together, aluminum nail production capacity has been expanded to keep pace with fastener requirements.

Marketing Well Planned

Alcoa has also created a special department to handle roofing sheet sales. In addition, the corporation last fall committed itself to the biggest advertising program in roofing history. Officials say results have been "more than satisfactory."

For example, they say that inquiries from October advertisements in farm publications alone exceeded total inquiries received during the preceding 9 months from all sources.

Alcoa has gone even further in pushing aluminum roofing. It sells its product in coil form to independent roofing fabricators. These use their own technique and equipment to make roofing for sale under their own brand or trade name.

With the farm roofing market apparently well in hand, the industry is going after other game. This is the commercial and industrial market. It hopes to tap this market and furnish a bigger proportion of roofing material and siding for construction of stores, garages, filling stations and other buildings in the commercial category. It expects to see wider use for warehouses, depots and factories.

Centralab Acquires New Plant

Milwaukee—The acquisition of a new plant in Denville, N. J., for production of ceramic capacitors, has been announced by Centralab Division of Globe-Union, Inc., Milwaukee, Wis.

The plant, which is expected to employ some 300 persons, will cover 46,000 sq ft, according to sales executive W. S. Parsons.

Tinnerman Products, Inc. of Cleveland, Ohio, manufacturers of Speed Nuts, use a No. 25 Grand Rapids Hydraulic Feed Surface Grinder in their tool room. Here their Model 25 is shown grinding a combination die.

You will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. One-piece column and base casting for vibrationless rigidity
2. Precision ball-bearing spindle which is greased for life
3. Bijur one-shot lubrication system eliminating hand oiling
4. Patented vertical movement of wheel head for quick, accurate adjustments
5. Portable coolant tank for ease of coolant replacement
6. Vane type hydraulic pump for fast longitudinal table travel

To serve you—

Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.

GRAND RAPIDS GRINDERS

GALLMEYER & LIVINGSTON COMPANY

200 Straight, S. W., Grand Rapids 4, Mich.

CHICAGO

STEEL PRESS BRAKES and HAND and POWER BENDING BRAKES

CRAFTSMEN IN
DIES—FORMING & PUNCHING
MANUFACTURERS OF
DOUBLE FOLDER BRAKES
SPECIAL BENDING BRAKES
OF ALL KINDS
MULTIPLE PUNCHES

DREIS & KRUMP MFG. CO.
7430 LOOMIS BLVD • CHICAGO 36, ILLINOIS

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CAP SCREWS • SET SCREWS
MILLED STUDS • COUPLING BOLTS

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YORK, PENNA

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AUTOMATIC EQUIPMENT
The VEO Press Company
HUDSON, NEW YORK

Famous for
• ACCURACY OF THREADS
• LOW CHASER COST
• ALL AROUND DEPENDABILITY
Bulletins available: General Purpose Die Heads, Insert Chaser Die Head, Threading Machines.

H&G DIE HEAD

See our Adv. on page 181 March 2 Iron Age

THE EASTERN MACHINE SCREW CORP., 21-41 Barclay St., New Haven, Conn.
Pacific Coast Representative: *A. C. Berkinger, 335 N. San Pedro Street, Los Angeles, California.* Canada: *P. F. Barber Machinery Co., Toronto, Canada.*

Herbrand SINCE 1881
PRECISION
DROP FORGINGS
...any size or shape up to 200 lbs.
Herbrand DIVISION
THE BINGHAM-HERBRAND CORPORATION, FREMONT, OHIO

It pays to do business in New York State!

There are far more industrial workers in New York State than in any other. Yet the ratio of time lost through strikes to total time available in this state last year was *half* the national average! For more information, write: N. Y. State Dept. of Commerce, Room 377, 112 State St., Albany 7, N. Y.

Need a Smaller COOLANT PUMP ?

RUTHMAN
BABY GUSHER
COOLANT PUMPS

INSTALLED AND RECOMMENDED BY LEADING MACHINE BUILDERS

Specifically designed for machines where smaller amounts of coolant are required, the "Baby Gusher" includes all the well known features built into every Ruthman Coolant Pump. Models available with capacities up to 10 GPM 1/30 to 1/10 HP in external right or left discharge models, flange mounted and immersed types. Write today for catalog and bulletin.

THE RUTHMAN MACHINERY COMPANY
1821 Reading Road - Cincinnati, Ohio

Upsetting & Forg. Machs., National High Duty, guided overarm heading slide, suspended slides, 1½", 2", 3", 4", 5"
Ajax & Acme Upsetting & Forg. Machs., not suspended slides, ¾", 1", 1½", 2½", 3"
W. W. Bulldozers, #22, #4, #24, #5, #8
Drop Hammers, 800# to 2500#
Nazel Air Forg. Hammer, #6B, Cap. 7" sq.
Bradley Hammers, Cushioned Helve, Upright & Compact
Trimming Presses, #59¼ Toledo, Tie Rod, 440-tons; other trimmers 55 to 200-ton
Bar Shears, Open & Guillotine, ⅝" to 7" Rd.
Minster 88-ton O.B.I. Press
Minster 88-ton S.S. Press, 16" stroke
Solid Back Presses, 20 to 100-ton
#94-A Toledo S.S. Double Crank, Tie Rod Press; bolster 40x36"
Bliss Knuckle Joint Press, 250-ton
Thomas Beam Punch, Ram 32x38"; table 27x46", 300-ton
Cleveland EF Sgl. End Punch, 48" throat, 1¼" thru 1"
Single & Double End Punches, various throat depths and caps.
L. & A. Multiple Punch, 8', 150-ton
L. & A. Multiple Punch, 10', 350-ton
Ryerson Serpentine Throatless Shear, ½"
#416-C Niagara Circle & Slitting Shear, ¼"
Flanging Machine, McCabe, cap. ¾"
Bertsch Straightening Roll, 1"x68"
Ryerson Friction Saws, #0, #1 & #3
Landis Threading Machine, 1", 2-Sp. lead screw, Lanco Hds., M.D., single up to 4"

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, COLD BOLT TRIMMERS, THREAD ROLLERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES, POINTERS, THREADERS, WOOD SCREW EQUIPMENT

Diamond Face Grinder, Segment Wheel 36", Table 84"x24", Hydraulic operated
Landis Motor Driven Pipe Threader, 8"
American Wheelabrator, 20x27
Southwark 400-ton Wheel Press

DONAHUE STEEL PRODUCTS CO.
1913 W. 74th Street, Chicago 36, Ill.

LIKE NEW

48" x 48" x 16' CINCINNATI HYPRO PLANER with 2 rail heads, 2 side heads, tool lifters, vari-voltage drive, complete controls. New in 1942. Used only in toolroom.

O'CONNELL MACHINERY COMPANY
1821 Niagara St. Buffalo 7, N. Y.
BEdford 8500

Heald No. 25A-24 Rotary Surface Grinder.
20" American Oil Extractor, 1944.
No. OG B&S High Speed Autos. with mag. feeds.
No. 2 Norton Tool & Cutter Grinder.

D. E. DONY MACHINERY CO.
47 LAURELTON ROAD, ROCHESTER 9, N. Y.

THE CLEARING HOUSE

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Machine tool manufacturer sets up competitive rebuilding program

Army-Navy preparedness program assisted by MDNA members

NISA meeting features series of management talks

Rebuilding Program Designed To Compete With Used Dealers

Cleveland—In order to meet the competition of used machinery dealers a large machine tool manufacturer has set up a trade-in and rebuilding program for turret lathes of its own make. The company's sales records indicate that their real competition is the used machinery dealer.

The plan, developed by Warner & Swasey Co. will put the firm in a position to offer factory rebuilt and guaranteed machines to customers who cannot afford new ones. At the present time the company is in the process of rebuilding 20 turret lathes. A company spokesman announced that it may go into the used market to buy some of its own machines in order to get the program fully under way.

1934 Models Can Be Traded-In

The company feels that the plan to offer trade-in allowances on any Warner & Swasey turret lathe of 1934 vintage or later will not only place the firm in a more competitive position with second hand dealers, but will also stimulate the sales of new machines.

For the user who is planning to rebuild rather than buy a new machine, the trade-in allowance plus the cost of rebuilding will amount to approximately 80 pct of the price of a new machine. The allowance and final price will vary with the machine.

The program is a partial resumption of Warner & Swasey prewar trade-in and rebuilding policy. The company has no plans for a similar program for tappers, automatics, and its other machinery.

MDNA CHAPTER MEETINGS

CHAPTER	DATE	TIME	PLACE
Detroit	Tues. Mar. 14	7:00 p.m.	International M'ch'ry Co.
New York	Thurs. Mar. 23	6:30 p.m.	Cavanagh's
Philadelphia	Tues. Mar. 28	6:30 p.m.	Warwick
Los Angeles	Tues. Mar. 28	6:30 p.m.	Elks Club

MDNA Assists Joint Army-Navy Ordnance Preparedness Program

Chicago—J. M. P. Fox, executive director of the Machinery Dealers National Assn., has enlisted the aid of this organization to help locate presses suitable for artillery cartridge case production for the Chief of Ordnance, Department of the Army. Mr. Fox points out that there is no purchase order on hand for these presses. This is simply part of the government plan of preparedness in the event of an emergency.

The Department desires to know the location of each one of these machines, whether it is in the stock of a dealer or in the hands of a user. Copies of the list of cartridge case presses that this Department and the Navy Bureau of Ordnance are trying to locate have been forwarded by the MDNA director to members of the organization.

Member dealers are actively cooperating in the location of this equipment. When assembled and tabulated, these figures will be forwarded to Washington.

Turn to Page 178

AARON FOR RELIABILITY

AUTOMATICS
Brown & Sharpe #00G, H.S. #4 & 6
Brown & Sharpe #2G, 1½" cap.
Conomatic 8 sp. 1⅞" cap.
New Britain Gridley 6I—2¼" 6 sp.
Cone ⅝" Swiss type

BORING MILLS
Giddings & Lewis #0, #25T
Lucas #3I horiz.
Universal 3" horiz. equipped
Bullard 42" V.T.L.

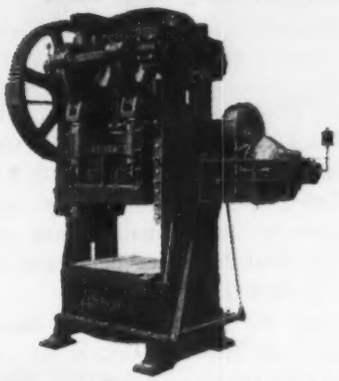
DRILLS AND RADIALS
Allen 8 spindle
Cincl-Bickford Sup. Ser. 21"
Meyersford Excelsior 21"
Cassady-Otto 3'-9" rol.
Carlton 8'-18" sel.
Sibley 24" & 26"

ENGRAVERS
Gorton #3U, 2 dimensional
Gorton Cutter Grinders 375-2, 285-6
Deskel GK1 3 Dimensional

GEAR EQUIPMENT
Barber-Colman #3 Hobbers (3)
Gleason 3" Generator
Hamilton Hobber
Fellows 645Y, #7, #72, #725 High Speed Shapers
Mikron Gear Hobber
Fellows, Michigan, Gleason Checkers

GRINDERS, MISCELLANEOUS
Brown & Sharpe #5 cyl., 3" x 18"
Brown & Sharpe #1, #2, #3 Univ. #13 Tool
Cincinnati #2 Centerless Filmatic, 12 x 30 Univ.
Cincinnati #2 Tool & Cutter, univ.
Cinn. 12 x 48" Univ., Gardner #22B, 30" disc.
Covel #9IA Univ. Tool & Cutter, Hammond #4
Heald 72A3 Int. Centerless Sizematic, #1 Tool
J. & L. TG636 Thread Grinder
Landis #4H Cyl. 4x12", Centerless, #6 Thread
Norton #2 Tool & Cutter, Type C, 8x30"
Oliver #510 Drill Pointer, Sellers 4G, Black D'mond
Pratt & Whitney Radius #R6, K.O. Lee Tool
Porter Cable Belt WG8, G8; Grenby Int.

GRINDERS, SURFACE
Abrasive #3B, 8x24", #33, #34 Vert.
Blanchard #16, 30" Mag. Chuck, #11—10" chuck
Brown & Sharpe #2
G. & L. #25, #35 Hyd. Feed, 6 x 18, 8 x 24



Bliss 406-48" Dbl. Crank, Dbl. Action Toggle Press

Hamshett 300 series, 13x48" with chuck, Hammond #2
Norton 6x18" Hyd., Atlantic 6x18" Power Feed
Reid #2A P.F. MIB., #2C Pope Spdl.
Pratt & Whitney 12x36" Vert.
Thompson Hyd. 6x10x18", 6x12x18"

LATHES
Hardinge Precision 9", 1" Collet Cap., Rivett
Hendey G.H., 16x30", Rel. Att. Bradford 14"x8'
LeBlond Regal 15x30", 21x60", 10"x3½', 19x48"
LeBlond Heavy Duty 16x33"
Lodge & Shipley 16x78" T.A., Collets, etc.
Monarch 10"x20" EE, 16x78 G.H., 12x30"
Sebastian 12"x4' G.H.
Sheldon 11"x24", Logan 10"x30"
South Bend 13x30", 14½"x0', 10x4, 9x3, 9x3½

MILLS, PLAIN, UNIVERSAL & PROD.
Brown & Sharpe #000, 12, 2I, #2A Univ., 2B PL.
Burke #4 Plain & Univ. Vert. Hd.
Cincinnati 2MH Univ.—I-12, I-18, 2-18 Mfg.
Kent Owens #1V; U.S. Hand Mills
Milwaukee #2HL, 2H Univ., 2H Plain
U. S. Multimiller
Sundstrand 00 Rigidmill; Whitney Hand Mills
Van Norman #12, 22L, 36; U. S. 1 & 2 sp.

MILLS, VERTICAL
Bridgeport Vert. Slotter, Hor. Sp.
Brown & Sharpe #2
Cincinnati #4
Fondiek Jig Borer #42A, HD. Equipped
Gorton #8D, 9J Plain, 8½D Duplicator
Sip Jig Borer #MP-5
Index, Jackson, Vernon
Milwaukee 3H, H.S.D.T.
Morey #12M Profiler 2 sp., P. & W. 12B

PRESSES
Bliss 675, 850, 845B Hi-Production Presses
Bliss #8 Dbl. Crank, Bed 42"x96"
Bliss 19, 20, 2I OBI, 58, 62, 62A, 102 OB.
Bliss #4½ Double Action, Roll Feeds

HYDRAULIC EQUIPMENT

Cap.	Manufacturer	Platen	Stroke	Opening
550	Southwark	42x32"	28"	58"
500 Ton	Lake Erie	35x36"	36"	66"
800	Bald.S'thw'k	76x59"	22"	30"
500 D.A.	H.P.M. (160 Cushion)	36x36"	24"	30"
300	Brand New Watson Stillman Hobbing Press			
50	Dennison	22x20	18	23
150	Southwark	84x30	30	2' to 4'

UP MOVING RAM PRESSES

150 and 100 Ton Stokes Molding Presses & Pumps
300 Ton Dunning & Boschert Molding Press
500, 800 Ton Waterbury-Farrel 3 & 4 Rod Presses, 6 & 8½ strokes
300 Ton Watson Stillman Press, 24x20" Platens
500 Ton Shaft Straighteners—Self Contained

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Air Hydraulic Presses—Arbor Presses #6C Famco—Band Saws Kalamazoo—Drill Presses all sizes—Hydraulic Press Northern 20 Ton—Injection Molders, 1 ounce—Power Presses, OBI, 4½, 5, 7½, 10, 12, 18, 30 ton—Shaper, 7" Amco, 8" Shaperite—Shaper, Sheldon 12"—Shears, Foot 22" to 8', 16 & 18 ga.—Shears, Power, 3'x18 gauge to 10'x19 ga.—Welders, Arc, Seam, Spot all sizes—Vert. Milling Attach. Haiso H.S.—Motors, Grinders, Buffers, all sizes.

Henry & Wright 75 Ton Dieing, 25 Ton
Z & H 30 Ton OBI
Toledo 400 Ton Knuckle Joint
V. & O. #102 O.B.I. Reducing

TURRET LATHES
Acme #6W Bar & Chuck, Acme 6W Fee, 4W
Bardons & Oliver #3, 1½" cap., #5, 2" cap.
Brown & Sharpe #1, 2F, Hand
Gisholt #4, 5 Bar & Chuck, IL, Foster #3B
Hardinge ESM Second Operation
J. & L. 8A—Well Tooled
Oster #60I Rapiduction, well tooled
Warner & Swasey #3, 4, 3, Universal
Warner & Swasey #4A, 8" cap. Power Chucks (2)

MISCELLANEOUS
Band Saw; Tannewitz #36M, DoAll ML, V16
Bending Roll; Buffalo #0, ½WR, Excelsior #14
Broach; American Horiz. Hyd. Model H-15-60
Hacksaw; Marvel 6A Automatic #6
Hardness Tester; Clark
Hone; Micromatic #H-1, Sunnen
Keyseater; Davis, Baker, M & M
Riveters; HI Speed
Router; Osgrud #W240, 5S
Saws; Wells, Catskill, Peerless, Kalamazoo
Slotter; P. & W. 6" Vert. Shaper
Shaper; 8" Shaperite, 7" Atlas
Shear; Pexto 6'x14 Ga.
Tappers; Bakewell #1, Haskins #2C, 3C
Welders; Seam & Spot; Thompson, Taylor-Winfield, Sciaky

This is but a partial listing. Write for free Catalog. Inquiries invited.

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LATE TYPE TOOLS

1⅜" Cleveland Automatic Screw Machine, Model AA 08
20/24" G & E Shaper
Cylindrical External Grinder, Cincinnati, 6 x 18, ser. #51A1 M-28
8" Billet Breaker—wt. 44 ton, 1945
Centerless Grinder, Cincinnati #2
#8I Heald Centerless Internal Grinder with extra head
#30½ Bliss Press, SS, geared, 161 ton 1943
3 Spdl. Foote Burt Drill Press, each motorized, #3 taper

THE ELYRIA BELTING & MACHINERY CO.
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FOR SALE
1—Bryant #5B Internal Grinder
1—LeBlond 11" x 5' Geared Head Lathe
4—Kent-Owens #1-M Hand Milling Machines
4—Kinney Vacuum Pumps
2—Ajax Spark Gap Induction Units 35 KW
2—Ajax Spark Gap Induction Units 20 KW
Firth Sterling Steel & Carbide Corp.
McKeesport, Pa.

BL-2420 Keller (P&W) 3 dimen., 3 spind. (1942)
249 Barnes Hy. Honing, 9" x 16" (1940)
30' x 1" Cleve. Plate Planer
3L Gisholt Turret La., Hard. Ways, Chuck

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Metal Forming and Bending Machine
Lees-Bradner CT 36" Thread Millers (2)
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AIR COMPRESSOR

1000 Cu. Ft. Worthington "Feather Valve," 18" x 11" x 14" two stage with 185 HP synchronous motor on shaft.

AUTOMATIC

4⅜" Conomatic 4 spindle, serial No. 2191K with, reel, chip conveyor, extra equipment.

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4½ bar Lucas No. 33. Table 46" x 64", Max. height 36", Max. to outboard support 11'.

100" Niles Bement Pond. Extra heavy type. 2 swivel heads, power rapid traverse, 35 HP direct current motor.

BROACH

15 ton 36" stroke American vertical duplex surface with tilting type workholder.

DRILL

42 spindle, No. B16 Natco multiple with 18" x 48" drilling area and two box tables.

GEAR HOBBER

Type T Barber Colman. Designed for either straight or taper splines, helical or spur gears. Also type A and Nos. 3 & 12 Barber Colmans.

GRINDERS

6" x 18", No. 10 Brown & Sharpe "Electric Hydraulic" Three with and two without spindle oscillation. New 1940 and 1941.

10" x 36" Norton type C hydraulic with hydraulic quick in-feed. Serial No. C16458, new in 1942.

10" x 72" Norton type C hydraulic made at factory to swing 14". Serial No. 21750, new in 1944.

23" x 36" Norton type C with mechanical table traverse, hydraulic quick in-feed. Serial No. C18281, new 1943.

LATHE TURRET

No. 2FU Foster Fastermatic Serial No. 2FU529, new in 1944. Quite a little tooling.

MILLERS

Cincinnati Hydromatic Sizes: 3-24, 34-36, 4-36, 4-48, 5-48, 56-72 and 56-90.

PRESSES

1000 ton, No. 666 Toledo knuckle joint Coining. 2½" stroke, 18" shut height, bed 37" F to B x 31" R to L.

350 ton Clearing Crankless, model F1350-42, serial No. 45-11155P, new 1945. 20" stroke, 28" shut height, 36" x 42" bed.

600 ton Hamilton No. 2316½ eccentric shaft forging. Stroke 4"; shut height 16", bed 28" F to B x 23¾" R to L.

No. 506 Bliss on inclined legs with double roll feed and scrap cutter. About 126 tons. 3" stroke, 11½" shut height.

1000 ton Baldwin Southwark "Hy-Speed" hydraulic. 20" stroke, 56" daylight, bed 42" F to B x 54" R to L.

UPSETTERS

2" National. Serial No. 13213. Has suspended slides with long overarm guide. Has 15 HP motor.

4" Ajax. Serial No. 3156. Has twin drive gears, suspended slides, self contained backshaft, 30 HP motor.

MILES MACHINERY CO.
SAGINAW, MICH.

Continued from Page 174

Over 80 NISA Members Hear Series of Management Talks

Cincinnati — Over 80 members attended the 7th Regional meeting of the National Industrial Service Assn. sponsored by the Cincinnati chapter. The meeting, held at the Hotel Gibson on February 10, 11, included a series of related addresses by local businessmen on administrative topics pertinent to the electrical industry.

Lynn H. Hummel, sales manager, Glow Electric Co., spoke on the topic of the Rebirth of Selling. Howard Campbell, president, Gardner Publications, Inc., covered Social Security & Pensions. H. Lyman Greer, vice president, Fifth Third Union Trust Co., spoke on Trends in Taxation. Fred Giesel, *Cincinnati Post*, told of the Eight Road Signs. Douglas K. Fuller, executive vice president, Cincinnati Chamber of Commerce, brought the members up to date on the Hoover Report.

Members participating in the luncheons and the Friday evening banquet also heard William L. McGrath, president, Williamson Heater Co., on The Challenge to Our American Way of Life; Fred Smith, vice president, William Powell Co., on Management—The Responsibility of Leadership, and Hon. James G. Stewart, Judge, Ohio Supreme Court, on Facing the Future.

NISA Chapter Elects Officers

Shreveport, La.—President Ward of the National Industrial Service Assn. was present at the meeting of the Southwestern chapter in this city on February 10, 11. An exceptionally good registration was reported. Dealers from Louisiana and Texas were in attendance. Officers elected for the coming year were John M. Young, president; J. B. Johnson, Ist vice president; Carl Pons, 2nd vice president; Gus R. Lieber, treasurer, and Virgil Goodman, secretary. The next scheduled meeting of the chapter will be held in Lubbock, Tex., in September.

Resume Your Reading on Page 175

LATE TYPE MACHINE TOOLS

16" 6 Spdl. Bullard Muir-Au-Matic. 1941.
No. 42 Lucas Horiz. Boring Mill. 1940.
5' 15" Cin.-Bick. Radial Drill. 1942.
No. 645A3, 615A & 61A Fellows Gear Shapers. 1944.
16" & 36" Cincinnati Plain Hyd. Grinder. 1942.
72" Thompson Hyd. Broach Grinder. 1941.
45" x 192" Axelson Engine Lathe. 1942.
36" & 42" Bullard Vertical Turret Lathes. 1943.
No. 3-36 Cincinnati Duplex Milling Machine.
No. 3B P&W Univ. Die Sinker. 1943.
No. 40-5½ Minster Straight Side Press. 1942.
150 KVA Federal Seam Welder. 1943.

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#30 "Tri-Way" Universal Horizontal Boring Mill, 3"
#33 Lucas 4½" bar Horizontal Boring Mill
#61-A Fellows Gear Shaper
6'-17" Carlton Radial Drill
48" x 48" x 17' Powell Planer, 4 heads

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BAKING OVEN, "Gehnrich", gas fired recirculating type I.D. 11' wide, 7' high, 19' long. Temp. range 350-400°F., All motors, controls and drawings included. New 1942. Inspection and demonstration invited. $2500

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